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# Vertebrate Fauna Assessment
# Yeelirrie Project

# Baseline Report

Dingo pup at a cave in Yeelirrie (R. Browne-Cooper)

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## ACKNOWLEDGEMENTS

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## EXECUTIVE SUMMARY

### Background

BHP Billiton Yeelirrie Development Company Pty Ltd (BHP Billiton) proposes to develop the Yeelirrie project, located on Yeelirrie Station, near Wiluna, Western Australia. As part of the Environmental Review and Management Programme (ERMP) for the Yeelirrie project, Bamford Consulting Ecologists (BCE) was commissioned to conduct a Detailed Level 2 Vertebrate Fauna Assessment within the Yeelirrie Project area (the Project area), in accordance with Environment Protection Authority (EPA, Western Australia) Guidance Statement No. 56 (EPA 2004). The key objectives of the fauna assessment are listed below, with the last objective being addressed in the ERMP document.

- conduct a desktop review to identify the vertebrate fauna assemblage that may occur within or adjacent to the Project area and review this with respect to fauna habitats present;
- investigate the likelihood of conservation significant species being present, and locate and record evidence of these;
- identify and describe fauna habitats present, particularly those that are significant or fragile;
- identify general patterns of biodiversity within or adjacent to the Project area;
- identify any ecological processes within or adjacent to the Project area upon which fauna may depend and with which the proposal may interact; and
- identify potential impacts upon fauna.

### Study area

Information for this report was collected from a defined field study area which includes the Project area and areas which were considered relevant in a regional context or for particular conservation significant fauna area, such as the Barr Smith Range. BCE's fauna surveys were concentrated in the centre of the Project area, within and nearby the resource. Sites investigated outside the Project area were identified during the desktop assessment as being of interest for regional context or to target species of conservation

significance. The total field study area covers approximately 100 000 ha. A desktop review was also undertaken to gather regional data and included database searches spanning approximately 50 km from the resource area.

**Fauna assessment**

The fauna assessment comprised an initial desktop review and site inspection in February 2009 with field surveys in March, July and November 2009 and May 2010. The desktop review was carried out by accessing a range of databases, published and unpublished sources. Field investigations included a site reconnaissance, two intensive trapping surveys (March and November 2009) and two surveys to target significant species (July 2009 and May 2010).

**Fauna habitat**

Eight major fauna habitats identified (from an elevation of high to low in the landscape) were:

- Granite Outcrops and Breakaways.
- Scattered Shrubs over Spinifex Sandplain.
- Mulga over Spinifex Sandplain.
- Acacia Woodland over Sparse Spinifex.
- Hardpan Mulga.
- Calcrete (including areas of *Eucalyptus gypsophila* woodland).
- Chenopod Shrubland on Sandplain.
- Calcrete Outwash.

In characterising fauna habitats, BCE utilised both field observations and vegetation communities recognised by Western Botanical (2010), however it should be noted that fauna habitats do not necessarily correspond exactly with them, as the emphasis with fauna habitats is upon vegetation structure, soil and topography rather than floristics.

Within the region, Granite Outcrops and Breakaways are well-represented outside the Project area but are poorly represented within the area, while all other habitats except Calcrete, Calcrete Outwash and Chenopod Shrubland on Sandplain are well-represented throughout. The Calcrete and Calcrete Outwash habitats are the most limited in extent and have a high proportional representation in the centre of the Project area.

**The vertebrate fauna assemblage**

The desktop review identified 292 vertebrate fauna species that may be expected to occur in the study area (10 frog, 88 reptile, 155 bird, 31 native mammal and eight introduced mammal species). The BCE field surveys in 2009 to 2010 recorded a total of 196 of these fauna species. This comprised four frog, 49 reptile, 82 bird, 21 native mammal and four introduced mammal species.

**Conservation significant species**

Thirty-five species of conservation significance are considered likely to occur in the study area. Of these, 20 are of high significance (Conservation Significance [CS] Level 1), being listed under legislation; seven are of moderate conservation significance (Conservation Significance Level 2), being listed as priority species by the Department of Environment and Conservation (DEC); and eight are of local significance (Conservation Significance Level 3), because they have restricted distributions or are listed as declining species in the region.

Eight conservation significant fauna species were recorded in the areas assessed during BCE's field surveys: the Bush Stone-curlew (CS2), Malleefowl (CS1), Peregrine Falcon (CS1), Australian Bustard (CS2), Rainbow Bee-eater (CS1), Brush-tailed Mulgara (CS2), Black-flanked Rock-Wallaby (CS1) and Greater Long-eared Bat (CS2). An additional five conservation significant species have been recorded previously at Yeelirrie including the Eastern Great Egret (CS1), Sharp-tailed Sandpiper (CS1), Major Mitchell's Cockatoo (CS1), Fork-tailed Swift (CS1) and Square-tailed Kite (CS3).

Even among species that were recorded, the significance of these findings are considered to be minor in most cases because the species is considered to be an irregular visitor (16 species), a resident but very widespread (e.g. Peregrine Falcon, Australian Bustard, Square-tailed Kite) or there is little, if any, habitat actually within the study area (eg. Great Desert Skink, the legless lizard *Aprasia picturata*, Long-tailed Dunnart, Kultarr). For six significant species, the study area may be of moderate importance. These are:

- Malleefowl - population known in region and considered to be significant by Benshemesh *et al.* (2008);
- Black-flanked Rock-Wallaby - population known in region;
- Slender-billed Thornbill - may be present with suitable habitat within the study area but only a small proportion in impact areas;
- Brush-tailed Mulgara – large local population found by BCE (see below);
- Bush Stone-curlew – local population found by BCE (see below);
- Greater Long-eared Bat – species found in area by BCE and suitable roosting habitat (tree hollows) within and close to the resource.

Most of the recorded significant species were found in low numbers and/or outside the resource area. The Brush-tailed Mulgara, however, was abundant in areas of open Mixed Shrubland on Spinifex sandplain across the Project area, with low densities recorded in some parts of the resource area. The Malleefowl population on Yeelirrie Station is significant (Benshemesh *et al.* 2008), and is likely to be confined to Acacia shrublands on sanplain in higher landscapes. One *inactive* mound was found by BCE approximately two kilometres north of the centre of the resource area and other mounds were found by the Malleefowl Preservation Group well to the north and south of the Project area, the closest being approximately 15 km from the centre of the resource area.

**Patterns of distribution and abundance**

Trapping and bird censussing provided some information on patterns of distribution and abundance of the general fauna assemblage. Reptiles were most abundant and species

rich in the Scattered Shrubs over Spinifex Sandplain, although they were also moderately well-represented at two of the four sampling sites in the Calcrete fauna habitat. These two sites had the best-developed euclaypt overstorey and therefore the best development of a leaf-litter layer. Mammals were also most abundant in the Scattered Shrubs over Spinifex Sandplain. Birds were most abundant and species rich in the two Mulga fauna habitats (Hardpan Mulga and Mulga over Spinifex Sandplain) but were also abundant and species rich at one of the Calcrete sites where *Eucalyptus gypsophila* formed a continuous woodland. This site had several species of birds that are thought to be dependent on eucalypt foliage that were present in only small numbers elsewhere. The closed Acacia Woodland over Sparse Spinifex was low in reptiles, mammals and birds.

Close to the resource area, where development of the mine and associated infrastructure will occur, lie the Calcrete and Calcrete Outwash habitats, with small areas of the two Mulga habitats, Mulga over Spinifex Sandplain and Hardpan Mulga, and the dense Acacia Woodland over Sparse Spinifex also included. A proposed quarry will incorporate a small area of granite breakaway adjacent to the Barr Smith Range. The Scattered Shrubs over Spinifex Sandplain habitat that was found to be rich in reptiles and mammals is largely outside the resource and immediate surrounds, as are most areas of the two Mulga habitats. Most of the woodland of *E. gypsophila* in Calcrete habitat, found to be rich in reptiles and birds, is situated within the north-west portion of the resource and extends north-west approximateky 14 km.

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**TABLES**

**FIGURES**

# 1. Introduction

## 1.1 Background

BHP Billiton Yeelirrie Development Company Pty Ltd (BHP Billiton) proposes to develop the BHP Billiton Yeelirrie Uranium Project (Yeelirrie project). As part of the Environmental Review and Management Programme (ERMP) for the project, Bamford Consulting Ecologists (BCE) was engaged to conduct a Detailed Level 2 Fauna Assessment of the vertebrate fauna within the Yeelirrie Project area (the Project area), in accordance with Environment Protection Authority (EPA, Western Australia) Guidance Statement No. 56 (EPA 2004). A Detailed Level 2 Fauna Assessment involves a comprehensive assessment including a desktop literature study and multiple field surveys to assess the fauna values in the region. This report presents the results of the desktop assessment and field surveys undertaken in March, July and November 2009, and May 2010. It incorporates and supercedes the preliminary desktop report (BCE 2009). Potential impact to fauna was assessed in consultation with BHP Billiton and has been addressed in the ERMP.

## 1.2 Study Objectives

The objectives of the fauna studies were to determine the fauna values of a site and the likely impacts of the proposed Yeelirrie project in accordance with EPA (Western Australia) Guidance Statement No. 56 (EPA 2004). This provides government agencies with the information needed to assess the significance of impacts under state and government legislation. The key objectives of fauna studies are listed below, with the first four objectives being covered in this report, and the final two covered in ERMP.

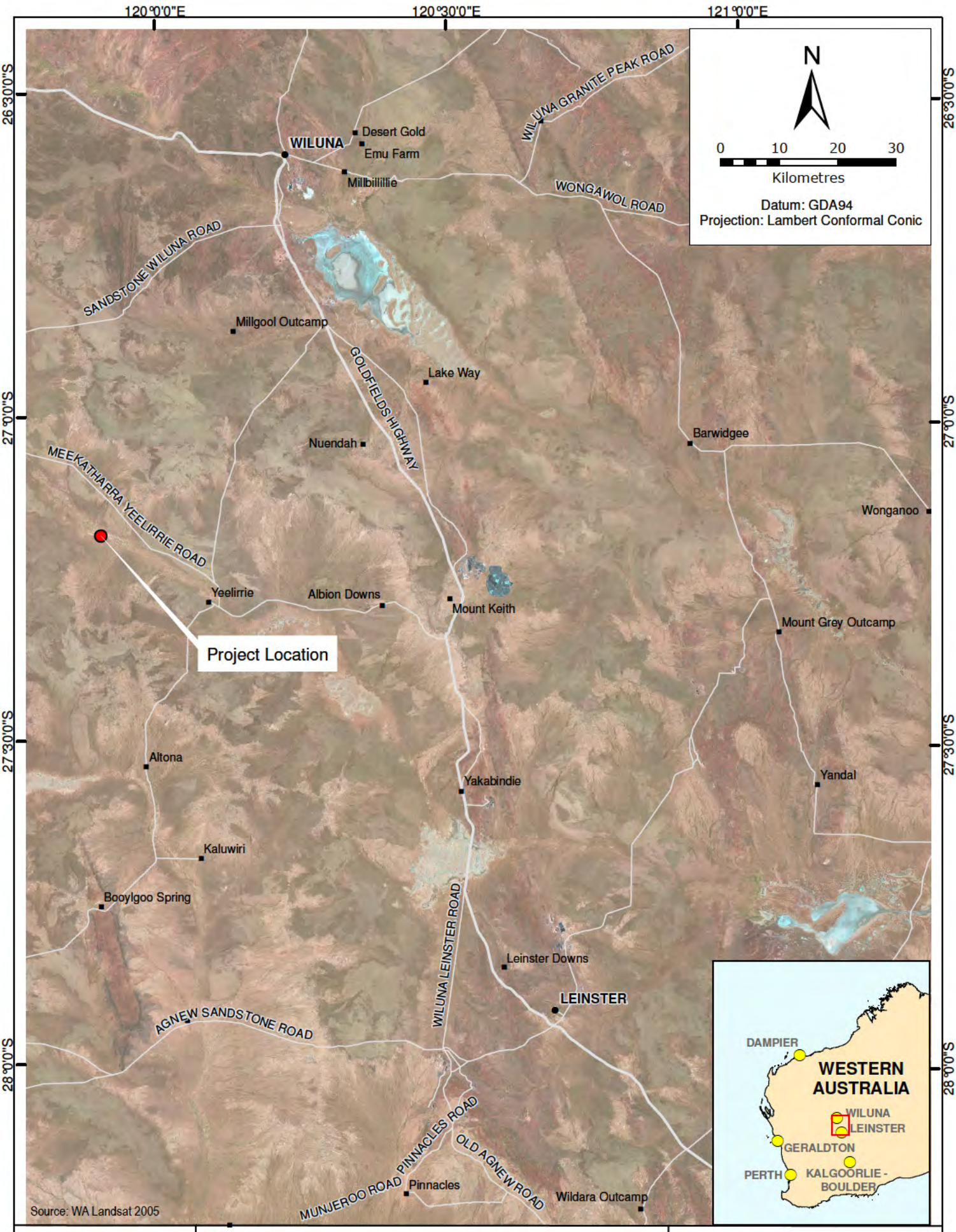
- conduct a desktop review to identify the vertebrate fauna assemblage that may occur within or adjacent to the Project area and review this with respect to fauna habitats present;
- investigate the likelihood of conservation significant species being present, and locate and record evidence of these;
- identify and describe fauna habitats present, particularly those that are significant or fragile;
- identify general patterns of biodiversity within or adjacent to the Project area;
- identify any ecological processes within or adjacent to the Project area upon which fauna may depend and with which the proposal may interact; and
- identify potential impacts upon fauna.

## 1.3 Location

The Project area is located on Yeelirrie Station and forms part of the Shire of Wiluna (Figure 1). The site is located at an elevation of between 480 and 595 m above sea level, approximately 550 km due east of Geraldton, 500 km north of Kalgoorlie, 110 km north-west of Leinster, 80 km south of Wiluna and 60 km west of Mt Keith.

For the purposes of this report, the four main areas relating to the project are: the pit or resource area, Project area, the indicative Project footprint and the study area (Figure ). The resource area is primarily situated in the centre of the Project area and is approximately 9 km in length and approximately 1.5 km wide. Other aspects of the Project area include the mine infrastructure such as the metallurgical plant and ore stockpiles, which will closely surround the resource. Mine infrastructure located further afield includes the quarry and access road to the quarry; the accommodation camp and access road to the camp, and a notional borefield and pipeline corridor, both of which are yet to be finalised at the time of writing this report. Collectively, the resource area and infrastructure components form the indicative Project footprint (Figure 2).

The study area covers approximately 100,000 ha and is defined as the area over which BCE carried out fauna surveys in the field. A desktop review was also undertaken to gather regional data and included database searches covering approximately 50 km from the resource area (Figure 2 - inset). The focus of field investigations was on the resource, its surrounding areas and fauna habiat extending outwards to the boundary of the Project area. However, some work was undertaken outside these areas to provide regional context or to target significant species (see Section 2.8). This included parts of the Barr Smith Range (40 km to the north and east of the Project area) which was identified on the basis of the desktop review as being of interest for significant species.

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| BHP Billiton Yeelirrie Development Company Pty Ltd | Project: **Proposed Yeelirrie Development** | | Title: Regional Location |
| BAMFORD CONSULTING ECOLOGISTS | Drawn: RNM/DL | Approved: KD | Date: 06/01/2011 |
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740000 750000 760000 770000 780000 790000 210000 220000 230000 240000 250000

7030000 7020000 7010000 7000000 6990000 6980000 6970000

MGA ZONE 50
MGA ZONE 51

N

0 2.5 5 7.5 10
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51

MEEKATHARRA YEELIRRIE ROAD
SANDSTONE WILUNA ROAD
GOLDFIELDS HIGHWAY
WILUNA LEINSTER ROAD
Barr Smith Range
RESOURCE
ALTONA YEELIRRIE ROAD

MEEKATHARRA
GOLDFIELDS HIGHWAY
WILUNA
CUE
LEINSTER
MOUNT MAGNET
LEONORA
0 50 100 150 200
Kilometres

Source: Landsat, 2005

**Legend**

- Project Area
- Study Area
- Indicative Project Footprint
- Pit Outline
- Desktop Review Area
- Ministerial Temporary Reserve TR70/6899

**Roads (GA, 2007)**

- Major Road
- Minor Road
- Track

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Vertebrate Fauna Study Area

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## 1.4 Project History

Yeelirrie Station was developed for pastoral production in 1925 and was subsequently largely destocked by Western Mining Corporation (WMC), whilst undertaking the previous exploration of the Yeelirrie Uranium Deposit between 1972 and 1981. From the early 1980s, the property ran a small number of sheep until quite recently when it was once again destocked as a result of predator (Dingo/Dog) problems.

Western Mining Corporation submitted an Environmental Impact Assessment (EIA) in 1978, providing an assessment of the Yeelirrie project as planned by WMC at the time. The EIA was approved by the Commonwealth Government under its *Environmental Protection and Administration Procedures 1974*, after satisfying the requirements of the Western Australian Government.

During 1972 through to December 1981, exploration for uranium was undertaken within the area now known as the resource (Outback Ecology 2009). Exploration included evaluation drilling and the excavation of test pits to determine ore viability. However, when the Federal Government implemented the "Three Uranium Mines Policy" 17 March 1983, the Yeelirrie project was placed into care and maintenance.

In mid 2004, Outback Ecology was commissioned by BHP Billiton Nickelwest to conduct rehabilitation of the exposed test pits and to provide an annual rehabilitation assessment. The information has been used to provide the Department of Mines and Petroleum (formerly Department of Industry and Resources) with several Annual Environmental Reports since this time.

BHP Billiton acquired the WMC Yeelirrie tenure in 2004 and following the change in policy on the development of new uranium mines by the West Australian Government in 2008, BHP Billiton officially informed the Government on 18 November 2008 of its intention to reactivate the Yeelirrie project.

## 1.5 Regional Description

The Project area lies within the Eastern Murchison subregion of the Murchison Bioregion (Figure 3). The regions are described by the Interim Biogeographical Regionalisation for Australia (IBRA) classification system (Environment Australia 2000, McKenzie et al. 2003; see Figure 3). The Murchison Bioregion falls within the Bioregion Group 2 classification (EPA 2004). Bioregions within Group 2 have been described as areas of "native vegetation that is largely contiguous but is used for commercial grazing".

The general features of the Eastern Murchison subregion are summarised by Cowan (2001). The subregion comprises a rich interzone between the arid and mesic biotas of south-western Australia, corresponding roughly to the "line" between the Mulga/Spinifex country and the eucalypt environments (Dell *et al.* 1998, McKenzie and Hall 1992). The subregion is characterised by its internal drainage and extensive areas of elevated red desert sandplains with minimal dune development. The climate is arid.

The dominant land use in this subregion is grazing, with smaller areas of crown reserves and mining. Only 1.4 per cent of the subregion is vested within conservation reserves (Cowan 2001). These include the proposed conservation pastoral leases Lake Mason and Kaluwirri, which lie approximately 30 km west of the Project area, and the Wanjarri Nature Reserve located 50 km east of the Project area.


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|---|---|---|---|
| Client: **BHP Billiton Yeelirrie Development Company Pty Ltd** | Project: **Proposed Yeelirrie Development** | | Title: Project Location Showing IBRA Sub-Regions |
| BAMFORD CONSULTING ECOLOGISTS | Drawn: DL | Approved: KD | Date: 06/01/2011 |
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## 1.6 Land Types and Land Systems

Payne *et al.* (1998) and Pringle *et al.* (1994) classified and mapped the Land Types and Land Systems of the eastern Murchison and north-eastern Goldfields regions, including the study area. Land Types are classified according to similarities in landform, soil, vegetation, geology and geomorphology. There are seven major Land Types in the vicinity of the study area (Figure 4).

Land Types are further divided into Land Systems based on similarities of vegetation, landform and soil. The Land Systems in the region provide an indication of the fauna habitats present and are indicated on Table 1. The predominant Land Systems within the study area are the Melaleuca, Mileura, Cosmo, Cunyu, Bullimore and Yanganoo Land Systems. The Bullimore, Yanganoo and Sherwood Land System are also widespread in the areas adjacent to the study area.

Table 1. Land types and land systems represented within the study area. Land type codes after Payne *et al.* (1998).

| Land Type Code | Land Type Description | Land Systems |
|---|---|---|
| 4 | Breakaways, stony plains and sandy surfaced plains on granite with mulga shrublands and minor halophytic shrublands. | Sherwood, Waguin |
| 9 | Stony plains and occasional low rises with Acacia-Eremophila shrublands. | Windarra |
| 10 | Sand plains with Spinifex hummock grasslands. | Bullimore |
| 13 | Wash plains on hardpan with mulga shrublands. | Hamilton, Ranch |
| 14 | Wash plains and sandy tracts on hardpan, with mulga shrublands and wanderrie grasses. | Monk, Yanganoo |
| 16 | Plains with deep sandy soils supporting Acacia shrublands and occasionally with wanderrie grasses. | Desdemona |
| 18 | Calcrete drainage plains with mixed halophytic and non-halophytic shrublands. | Cosmo, Cunyu, Melaleuca, Mileura |

750000 760000 770000 780000 790000 210000 220000

7020000 7010000 7000000 6990000 6980000 6970000

SANDSTONE WILUNA ROAD

MGA ZONE 50
MGA ZONE 51

N

0 2 4 6 8
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51

Waguin
Sherwood
Yanganoo
Bullimore
Melaleuca
Cosmo
Cunyu
MEEKATHARRA YEELIRRIE ROAD
Hamilton
Monk
Windarra
Mileura
ALTONA YEELIRRIE ROAD
Carnegie
Gransal

## Legend

- UTM Zones
- Study Area
- Pit Outline
- Minor Road

WA Landsystems (DAGR)

- Bullimore Land System
- Carnegie Land System
- Cosmo Land System
- Cunyu Land System
- Gransal Land System
- Hamilton Land System
- Melaleuca Land System
- Mileura Land System
- Millrose Land System
- Monk Land System
- Sherwood Land System
- Waguin Land System
- Windarra Land System
- Yanganoo Land System

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Study Area Showing Regional Land Systems

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## 1.7 Soil Landscapes and Vegetation

The nominated resource lies within the trunk valley of the ancient Yeelirrie paleodrainage system. Soil landscape systems have been described by DC Blandford & Associates (2009) within the Project area.

The central zone of the valley floor is occupied by a variable calcrete system, which is orientated north-west to south-east and is characterised by outcropping calcrete rises and a series of flats and clay flats. The margins of the calcrete system are surrounded by a playa system, which has numerous irregular small to large playas that run approximately parallel to the calcrete expression. The playa system is a transition zone reflecting the interaction between the central calcrete and the surrounding sandplain system, and is the major drainage focus for surface runoff along the valley floor. The colluvial sandplain system extends from the central valley of the paleochannel to the granite breakaways.

Previous assessments at Yeelirrie have shown a clear association of vegetation communities with soil and landforms. Vegetation communities within the Project area have been described by Western Botanical (2010). A complete list of the vegetation communities present in the Project area and their relationship to the soil landscapes is provided in Appendix 1. Soil landscapes and vegetation communities assist in formulating fauna habitats of the study area.

# 2. Methods

## 2.1 Approach

This fauna assessment was carried out with reference to guidance and position statements published by the Western Australian EPA on fauna surveys and environmental protection (EPA 2002, EPA 2004), and Commonwealth biodiversity legislation (EPBC Act 1999). The level of fauna assessment required by the EPA is determined by the size and location of the proposed disturbance and the sensitivity of the surrounding environment in which the disturbance is planned.

As discussed in Section 1.5, the Project area lies within Bioregion Group 2 as classified by the EPA (2004). Due to the scale and nature of the Yeelirrie project, a Detailed Level 2 Fauna Assessment (desktop review in conjunction with a detailed survey) is required to satisfy EPA guidelines.

The fauna assessment thus has two components: a desktop review and a site survey. The purpose of the desktop review is to produce a species list that can be considered to represent the (vertebrate) fauna assemblage of the study area based on unpublished and published data using a precautionary approach. The purpose of the site survey is to gather information on this assemblage: confirm the presence of as many species as possible (with an emphasis on species of conservation significance), collect information on the distribution and abundance of this assemblage in relation to fauna habitats present, and to assess the fauna habitats themselves. The desktop review was completed in 2009 (Section 2.7), with site surveys carried out from 2009 to 2010 (Section 2.8).

## 2.2 Personnel

This fauna assessment document was prepared by Dr Mike Bamford, Mr Jeff Turpin and Ms Natalia Huang (B.Sc. Hons.). All personnel involved were experienced in fauna assessments (see Section 2.9, Table 8). Field work was conducted by:

- Dr Mike Bamford (B.Sc. Hons. Ph.D.)
- Jeff Turpin (B.Sc.)
- Peter Smith (Dip.Ag.)
- Brenden Metcalf (B.Sc. Hons.)
- Robert Browne-Cooper (B.Sc.)
- Cameron Everard (B.Sc.)

## 2.3 Licences and Permits

The field surveys were conducted under Department of Environment and Conservation (DEC) Regulation 17 licence number SF006794.

## 2.4 Nomenclature and Taxonomy

As per the recommendations of EPA (2004), the nomenclature and taxonomic order presented in this report are based on the Western Australian Museum's (WAM) *Checklist of the Vertebrates of Western Australia* 2008. The authorities used for each vertebrate group are: amphibians and reptiles (Aplin and Smith 2001), birds (Christidis and Boles 2008), and mammals (How *et al.* 2001). English names of species, where available, will be used throughout the text; Latin species names are presented with corresponding English names in tables in the appendices.

## 2.5 Definition of Conservation Significance

The conservation status of fauna species in Australia is assessed under Commonwealth and State Acts such as the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and the *Western Australian Wildlife Conservation Act* 1950 (Wildlife Conservation Act). In addition, the Western Australian DEC recognises priority levels, while local populations of some species may be significant even if the species as a whole has no formal recognition. Therefore, three broad levels of conservation significance can be recognised and are used for the purposes of this report. A full description of the conservation significance categories, schedules

and priority levels mentioned below is provided in Appendix 2. These levels are:

***Conservation Significance (CS) 1*: Species listed under State or Commonwealth Acts.**

Species listed under the EPBC Act are assigned to categories recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN) and reviewed by Mace and Stuart (1994), or are listed as migratory. Migratory species are recognised under international treaties such as the China Australia Migratory Bird Agreement (CAMBA), the Japan Australia Migratory Bird Agreement (JAMBA), the Republic of South Korea Australia Migratory Bird Agreement (ROKAMBA), and/or the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals). The Wildlife Conservation Act uses a series of Schedules to classify status, but also recognizes the IUCN categories.

***Conservation Significance (CS) 2*: Species listed as Priority by the DEC but not listed under State or Commonwealth Acts.**

In Western Australia, the DEC has produced a supplementary list of Priority Fauna, being species that are not considered threatened under the Wildlife Conservation Act but for which the DEC feels there is cause for concern. Some Priority species are also assigned to the Conservation Dependent category of the IUCN.

***Conservation Significance (CS) 3*: Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution.**

This level of significance has no legislative or published recognition and is based on interpretation of distribution information, but is used here as it may have links to preserving biodiversity at the genetic level (EPA 2002). If a population is isolated but a subset of a widespread (common) species, then it may not be recognised as threatened, but may have unique genetic characteristics. An example of this is Woolley's Pseudantechinus (*Pseudantechinus woolleyae*), scats of which have been recorded within the study area (Appendix 3). It is not listed under Acts or in publications as being conservation significant, but would be classified at CS3 in

certain areas where it is found to have small, isolated populations. Conservation significance is applied to allow for the preservation of genetic richness at a population level, and not just at a species level. Species on the edge of their range, or that are sensitive to impacts such as habitat fragmentation, may also be classed as CS3. The Western Australian Department of Environmental Protection, now DEC (2000), used this sort of interpretation to identify significant bird species in the Perth metropolitan area as part of Perth Bushplan.

In addition to these conservation levels, species that have been introduced (INT) are indicated throughout the report. Introduced species may be important to the native fauna assemblage through effects by predation and/or competition. They are listed in Appendix 3 and include the Cat, Fox, Rabbit and Goat.

## 2.6 Assessment of Fauna Habitats

Fauna habitats were assessed as part of the field investigations (see Section 3.2). Fauna habitats as used in this report are actually broad associations of soils, vegetation and landform, whereas habitat is strictly a function of the animal and its ecology, rather than being a function of the environment. For example, a species may occur in eucalypt canopy or in leaf-litter on sand, both of which may occur on a wide variety of soils and vegetation types. Broadly described soil and vegetation associations, however, do provide a way of recognising the way in which the environment available for fauna is structured and distributed.

Fauna habitats do not necessarily correspond with Land Systems, Land Types, soil types or vegetation communities, but may reflect some of these elements. Vegetation structure, for example, can affect the recognition of fauna habitats even though the vegetation community may be considered to be the same; or similar vegetation structure may occur in different vegetation communities.

## 2.7 Desktop Assessment

Information on the fauna assemblage of the study area was drawn from a wide range of sources. These included databases, results of regional studies and results of some previous investigations at Yeelirrie.

Databases accessed were the DEC Naturemap (incorporating the Western Australian Museum's FaunaBase), Birds Australia's Atlas Database (BA), the DEC Threatened and Priority Fauna Database and the EPBC Protected Matters Search Tool (Table 2). In general, an approximate 50 km radius from the centre of the resource was applied to database searches (Table 2).

Regional information on fauna was available from Cowan (2001), who reported on vertebrate fauna, and particularly those of conservation significance, in the Murchison subregion. Thompson and Thompson (2006) prepared an inventory of 131 reptile species from a 10 year survey covering the area from Wiluna, south to Norseman, west to Merredin, and east to Laverton. Dell *et al.* (1998) summarise the results of surveys of fauna of the Eastern Goldfields undertaken from 1979 to 1981 by the Biological Surveys Committee of Western Australia. In addition to these databases and regional studies, there is information on fauna of Wanjarri Nature Reserve, 50 km east of Yeelirrie (DEC 2009).

There have been two previous studies at Yeelirrie. Observations on fauna were recorded at Yeelirrie Station during the previous mining trials (anon. 1978), and the Malleefowl Preservation Group (MPG) undertook systematic surveys for Malleefowl at Yeelirrie Station between 2000 and 2006 (Benshemesh *et al.* 2008).

Information from the above sources was supplemented with species expected in the area based on general patterns of distribution. Sources of information used for these general patterns were: Allen *et al.* 2002 (freshwater fish); Tyler *et al.* 2000 (frogs); Storr *et al.* 1983, 1990, 1999 and 2002 (reptiles); Blakers *et al.* 1984; Barrett *et al.* 2003, Johnstone and Storr 1998, 2004; Storr 1984 (birds); Churchill 1998; Strahan 1995; Menkhorst and Knight 2001 (mammals).

**Table 2. Types of records held on database, area searched and their source location**

| Database | Type of records held on database | Area searched |
|---|---|---|
| NatureMap (DEC 2009) | Records in the WAM and DEC databases. Includes historical data. | 119°52' 60" E, 27°10' 30" S; Buffer = 40 kilometres |
| Birds Australia Atlas Database | Records of bird observations in Australia, 1998-2008. | One degree square containing 119.89194 E, -27.17131 S |
| DEC Threatened and Priority Fauna Database | Information and records on Threatened and Priority species in WA. | One degree square bounded by 118.957 E, -26.265 S and 120.817 E, -28.07 S |
| EPBC Protected Matters Search Tool | Records on matters protected under the EPBC Act, including threatened species and conservation estate. | 119°52' 60" E, 27°10' 30" S; Buffer = 50 kilometres |

### 2.7.1 Interpretation of species lists

Species lists generated from the review of sources of information are generous as they include records drawn from a large region and possibly from environments not represented in the study area. Therefore, some species that were returned by one or more of the data searches have been excluded because their ecology, or the habitat types within the study area, meant that it was highly unlikely that these species would be present. In general, however, species returned by the desktop review process are considered to be potentially present in the study area whether or not they were recorded during field surveys. This is because fauna are highly mobile, often seasonal and frequently cryptic. Therefore, the precautionary approach is taken in that if a species is expected to be present and suitable habitat is available, the assumption is made that the species is present or may be present within the life of the project (approximately 30 years). This approach is in accordance with recommendations on the use of the precautionary principle in EPA Guidance Statement No. 33 (EPA 2008). This is particularly important for significant species that are often rare and hard to find.

Interpretation of species lists generated through the desktop review included assigning an expected status within the study area to species of conservation significance. This

is particularly important for birds that may naturally be migratory or nomadic, and for some mammals that can also be mobile or irruptive. The status categories used are:

- Resident: species with a population permanently present in the study area.
- Regular migrant or visitor: species that occurs within the study area regularly in at least moderate numbers, such as part of annual cycle.
- Irregular visitor: species that occur within the study area irregularly such as nomadic and irruptive species. The length of time between visitations could be decades but when the species is present, it uses the study area in at least moderate numbers and for some time.
- Vagrant: species that occurs within the study area unpredictably, in small numbers and/or for very brief periods. Therefore, the study area is unlikely to be of important for the species.
- Locally extinct: species that has not been recorded in the local area for at least 50 years and therefore almost certainly no longer present in the study area.

## 2.8 Field Surveys

The timing of field surveys was determined by Guidance Statement 56 (EPA 2004), which states: "fauna and faunal assemblage surveys conducted for baseline information should be multiple surveys conducted in each season appropriate to the bioregion and the faunal group. The most important seasonal activity times for many faunal groups are related to rainfall and temperature. Thus, a survey in the season that follows the time of maximum rainfall is generally the most productive and important survey time. However, in some cases there may also be a need to time surveys according to the seasonal activity patterns of particularly important species (such as Specially Protected Fauna or Priority species) or particular assemblages (e.g. amphibians [and migratory birds])".

The study area was visited on 12 to 13 February 2009 (site inspection), and this was followed by four detailed fauna surveys: 22 to 30 March, 17 to 22 July and 2 to 11 November 2009, and 5 to 10 May 2010.

Fauna survey techniques are described in the following sections. The main sampling techniques used during each survey are outlined in Table 3. All sampling techniques

were conducted during the March and November 2009 surveys; sampling during July 2009 and May 2010 was restricted to searching for conservation significant fauna.

**Table 3. Survey techniques and dates**

| Survey Technique | 22-30 March 2009 | 17-22 July 2009 | 2-11 Nov 2009 | 5-10 May 2010 |
|---|---|---|---|---|
| Pitfall traps | X | | X | |
| Elliott traps (including targeted trapping for the Mulgara) | X | | X | |
| Funnel traps | X | | X | |
| Cage traps | X | | | |
| Bird censussing | X | | X | |
| Bat surveys (Harp traps and Anabat) | X | | X | |
| Spotlighting | X | | X | |
| Targeted searching for Black-flanked Rock-Wallaby | X | X | X | X |
| Targeted searching for Crest-tailed Mulgara and Brush-tailed Mulgara | X | X | X | X |
| Targeted searching for Malleefowl | X | X | X | X |
| Searching for evidence of other conservation significant species | X | X | X | X |
| Opportunistic observations and searching | X | X | X | X |

As the local region can experience both summer and winter rain, trapping was conducted during March and November 2009. Targeted searching for conservation significant fauna was conducted in July 2009 and May 2010. Targeted searching, such as for Rock-Wallaby tracks and scats, Malleefowl mounds and Mulgara burrows, is independent of season as evidence of these species is present throughout the year.

### 2.8.1 Systematic fauna trapping and censussing

Fifteen survey sites were established to sample fauna within the study area; 10 sites established and sampled in March 2009 and sampled again in November 2009, and five sites established and sampled in November 2009 only (Figure 5 and Appendix 4).

Sampling took place over five nights in each period except at sites 1, 2, 3 and 8 in March 2009, when sampling was limited to two nights. Survey sites were selected to be representative of the Project area and to sample the majority of the major fauna habitats present (see Figure 5 and Table 4). Soil and vegetation codes as they relate to each major fauna habitat are given in Appendix 1. A summary of sampling methods and effort at each site is provided in Table 4.

The survey sites (see descriptions in Table 4) were distributed so that there was replication across the key fauna habitats. No sites were located within the Chenopod Shrubland over Sandplain habitat as it was determined to be well outside the area of potential impact arising from the project. Fauna habitats are described in Section 3.2. Sites across the key fauna habitats include:

- Sites 1, 8, 11 and 13. Calcrete. Site 8 had the lowest representation of *E. gypsophila* woodland.
- Sites 2, 3 and 12. Calcrete outwash.
- Sites 4 and 6. Hardpan Mulga.
- Sites 5 and 7. Mulga over Spinifex sandplain.
- Sites 9 and 10. Scattered shrubs over Spinifex sandplain.
- Sites 14 and 15. Acacia woodland over sparse Spinifex.

Sampling within each survey site included:

- Ten sampling sites, defined by 10 pitfall traps, each trap consisting of a 20 L bucket, 40 cm deep and with a diameter of 28 cm, with a two metre drift-fence placed either side of the trap. Pitfall traps were open for five consecutive nights at most locations but less at some sites in March 2009 due to access problems. A total of 149 pitfall traps were used giving a total of 1115 trap-nights (Table 4).
- A funnel trap, placed on one of the drift-fences running from a pitfall trap, with a further two metes of fence added to the opposite side of the funnel trap. Funnel traps were generally established at every second (even-numbered) sampling site and were also operated over five nights. A total of 102 funnel traps were used during the survey (five at survey sites 1 to 10, ten at sites 11, 12, 13 and 15, and

12 funnel traps at Site 14 where one pitfall trap was damaged and lost), giving a total trapping effort of 695 trap-nights (Table 4).

- An Elliott trap, placed near every second (odd-numbered) sampling site, near the pitfall trap. Elliott traps were baited with universal bait (peanut butter, sardines and rolled oats) and re-baited when necessary. Three additional lines of Elliott traps (total of 30 Elliott traps) were established in habitat identified as suitable for Mulgara species, adjacent to survey site 10, during March 2009. An additional five Elliott traps were established at sites 9 and 10 during the November survey to also target Mulgara species (total of 10 per site). A total of 125 Elliott traps were operated during the survey. Most were open for five consecutive nights, with a total trapping effort of 835 trap-nights (Table 4).
- Cage traps were placed in habitats potentially supporting large mammals. A total of 10 cage traps was used during the survey, giving a total trapping effort of 100 trap-nights.
- Observations (visual and auditory) of all birds within 25 m of each sampling site were recorded.

A total trapping effort of 2745 trap-nights was conducted during the March and November 2009 surveys (Table 4). Coordinates of sampling locations, sampling effort and details of vegetation and soils at each sampling location appear in Appendices 4 and 5 respectively. Photographs of each sampling site appear in Section 3.2.

**Table 4. Number of each trap type and sampling effort at each survey site. Sites are grouped by fauna habitat type. Vegetation descriptions and codes provided by Western Botanical (see Appendix 1).**

| Fauna Site | Fauna Habitat | Habitat Description | Pitfall Traps | Funnel Traps | Elliott Traps | Cage Traps | Sampling Nights - March | Sampling Nights – Nov | Total Trap nights |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Calcrete | *Eucalyptus gypsophila* woodland (CEgW vegetation community), on hydrophobic loam, fine sandy soil, with weathered carbonate and chert nodules | 10 | 5 | 5 | 0 | 2 | 5 | 140 |
| 13 | | *Eucalyptus gypsophila* woodland over *Acacia burkittii* and *Senna artemisioides* subsp. *filifolia* shrubland on stony loam, fine sandy over massive calcrete (CEgW vegetation community) | 10 | 10 | 10 | 0 | 0 | 5 | 150 |
| 8 | | *Eucalyptus gypsophila* woodland and *Acacia burkittii* shrubland with patches of *Casuarina pauper,* on stony loam, fine sandy over massive calcrete (CEgW and CAbS vegetation communities) | 10 | 5 | 5 | 0 | 1 | 5 | 120 |
| 11 | | Mosaic of *Acacia burkittii* shrubland, *Eucalyptus gypsophila* and *Casuarina pauper* open woodlands on a stony loam, fine sandy (Northcote, 1972), overlying carbonate rubble in a loam, fine | 10 | 10 | 5 | 0 | 0 | 5 | 125 |

| Fauna Site | Fauna Habitat | Habitat Description | Pitfall Traps | Funnel Traps | Elliott Traps | Cage Traps | Sampling Nights - March | Sampling Nights – Nov | Total Trap nights |
|---|---|---|---|---|---|---|---|---|---|
| | | sandy matrix. The surface is typically a lag gravel dominated by weathered calcrete (Vegetation communities – CAbS, CEgW and CCpW) | | | | | | | |
| 2 | Calcrete outwash | Chenopod (*Maireana pyrimidata* and *Atriplex* sp. Yeelirrie Station) shrubland (CMpS and CApS vegetation communities), on self-mulching, light to medium clays | 10 | 5 | 5 | 0 | 2 | 5 | 140 |
| 3 | | *Melaleuca xerophila* open woodland (CMxS vegetation community), on self-mulching clay to 0.3m, over powdery calcrete to 1.4m, over gritty clay with gypsum crystals | 10 | 5 | 5 | 0 | 2 | 5 | 140 |
| 12 | | *Lycium australe* shrubland on flats with variable silt/clay content and a surface of scattered lag gravels of quartz and calcrete with occasional pebbles (CLaS vegetation community) | 10 | 10 | 10 | 0 | 0 | 5 | 150 |
| 4 | Hardpan Mulga | Mulga (*Acacia aneura*) woodland with a sparse shrub understorey (PLAPoS vegetation community), on massive, indurated, gritty, loamy sand | 10 | 5 | 5 | 0 | 5 | 5 | 200 |
| 6 | | Mulga (*A. aneura*) woodland over *Eremophila forrestii* subsp. | 10 | 5 | 5 | 0 | 5 | 5 | 200 |

| Fauna Site | Fauna Habitat | Habitat Description | Pitfall Traps | Funnel Traps | Elliott Traps | Cage Traps | Sampling Nights - March | Sampling Nights – Nov | Total Trap nights |
|---|---|---|---|---|---|---|---|---|---|
| | | *Forrestii* (HPMS vegetation community), on massive indurated loamy sand | | | | | | | |
| 5 | Mulga over Spinifex sandplain | Mulga (*A. aneura*) woodland over Spinifex (*Triodia basedowii*) (SAMU vegetation community), on massive indurated loamy sand | 10 | 5 | 5 | 0 | 5 | 5 | 200 |
| 7 | | Mulga (*A. aneura*) woodland over Spinifex (*T. basedowii*) hummock grassland (SAMU vegetation community), on a massive gritty loamy sand to 1.2m, overlying a massive mottled sandy loam, overlying weathering granite at 1.5m (roots at 1.3 ms below ground level) | 10 | 5 | 5 | 0 | 5 | 5 | 200 |
| 9 | Scattered shrubs over Spinifex sandplain | Spinifex (*T. basedowii*) hummock grassland with scattered recently burnt Acacia shrubs (SAWS vegetation community), on massive loamy sand, gritty in part to 1m, overlying highly indurated gravels with ferricrete and angular quartz | 10 | 5 | 5 (Mar), 10 (Nov) | 5 | 5 | 5 | 275 |
| 10 | | Spinifex (*T. basedowii*) hummock grassland with Mallee (*Eucalyptus* spp.) and scattered low shrubs on sand plain (SAMA vegetation community), | 10 | 5 | 30 (Mar), 10 (Nov) | 5 | 5 | 5 | 400 |

| Fauna Site | Fauna Habitat | Habitat Description | Pitfall Traps | Funnel Traps | Elliott Traps | Cage Traps | Sampling Nights - March | Sampling Nights – Nov | Total Trap nights |
|---|---|---|---|---|---|---|---|---|---|
| | | on a gritty, weak earthy fabric, loamy sand to 1.8 m, overlying a strongly indurated sediment with ferricrete and carbonate nodules, with abundant roots at 2m | | | | | | | |
| 14 | Acacia woodland over sparse Spinifex | Mulga (*A. aneura*) shrubland over Spinifex (*T. basedowii*), on red loamy sand to fine sandy loam (SAMU vegetation community) | 9 | 12 | 10 | 0 | 0 | 5 | 155 |
| 15 | | Spinifex (*T. basedowii*) hummock grassland with *Acacia effusifolia* shrubland on red sands to sandy loams (SAWS vegetation community) | 10 | 10 | 10 | 0 | 0 | 5 | 150 |
| | | **Total Trap Nights** | 1115 | 695 | 835 | 100 | | | 2745 |

760000 770000 780000 790000 210000 220000 230000 240000 250000

7010000 7000000 6990000 6980000 6970000 6960000

MGA ZONE 50
MGA ZONE 51

N

0 2 4 6 8 10
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51

SANDSTONE WILUNA ROAD

Barr Smith Range

10
9

Inset

14
8
7
11
13
15
1
2
3
12
6
5
4

MEEKATHARRA YEELIRRIE ROAD

Inset

ALTONA YEELIRRIE ROAD

GOLDFIELDS HIGHWAY

WILUNA LEINSTER ROAD

Source: Landsat, 2005

**Legend**

- Study Area
- Pit Outline
- Trapping / Censussing Location

**Fauna Habitat derived from Western Botanical (Bamford, 2011)**

- Calcrete
- Calcrete Outwash
- Chenopod shrubland over sandplain
- Granite Outcrops and Breakaways
- Hardpan Mulga
- Mixed Shrubs over Spinifex sandplains

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Systematic Fauna Trapping and Bird Censussing Locations

| Drawn: DL/CJT | Approved: KD | Date: 20/01/2011 | Figure: 5 | Rev. D |
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### 2.8.2 Targeted surveying for conservation significant fauna

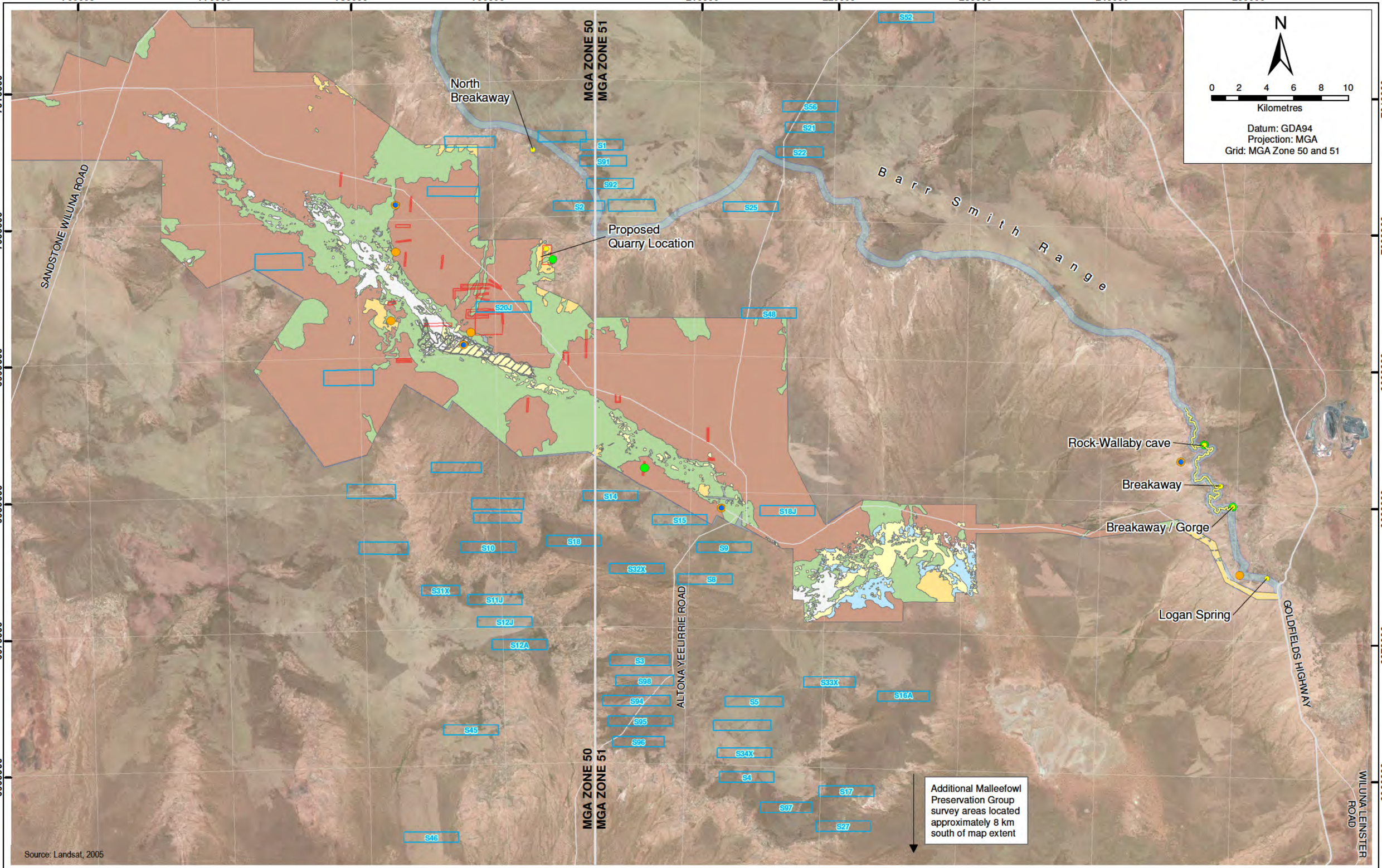
Significant fauna species identified during the desktop assessment include several that can be found by searching for evidence of their activities (e.g. scats, tracks, diggings, burrows), and therefore targeted surveys for these species were undertaken. Targeted surveys were conducted during all site surveys, within the Project area and within suitable adjacent habitat (see Table 3 and Figure 6). These surveys focussed on the Brush-tailed Mulgara, Crest-tailed Mulgara, Malleefowl, Slender-billed Thornbill, Black-flanked Rock-Wallaby, Greater Bilby, Great Desert Skink, Western Spiny-tailed Skink and Long-tailed Dunnart, and methods are outlined below. Some of these species can also be detected by trapping, but searching for evidence can be more efficient and provide reasonable estimates of distribution and abundance.

Survey transects within the Project area

Searching was conducted for both the Mulgara species (burrows, foraging holes, tracks, scats), the Malleefowl (tracks and mounds), Slender-billed Thornbill (tracks), Greater Bilby (tracks, burrows and scats), Great Desert Skink (burrow systems and scats) and Western Spiny-tailed Skink (scats in suitable logs or rocks). Searching was approached systematically by walking with personnel in a line, spaced about 30 m apart, so that a transect of known length and width (and therefore area) was searched. All personnel involved in searching were familiar with the evidence of each species, or were trained by experienced personnel on site.

Transects were surveyed throughout the Project area with a focus on areas where main project activities are likely to occur. Locations of transects are illustrated in Figure 6 and coordinates of transects are given in Appendix 6. There were 82 transects surveyed covering a total area of 842 ha.

A similar approach had been used by the Malleefowl Preservation Group (Benshemesh 2008) to survey for Malleefowl tracks and mounds. Locations of these transects are indicated on Figure 6.




Study Area
Pit Outline
Anabat Location
Camera Trap Location
Harp Trap Location

Bamford Consulting Ecologists Targeted Significant Fauna Transect
Malleefowl Preservation Group Survey Area (Benshemesh *et al.* 2008)
Rock-Wallaby Survey Location
Rock-Wallaby Survey Transect

**Fauna Habitat derived from Western Botanical (Bamford, 2011)**
Calcrete
Calcrete Outwash
Chenopod shrubland over sandplain
Granite Outcrops and Breakaways
Hardpan Mulga
Mixed Shrubs over Spinifex sandplains

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Targeted Surveying for Conservation Significant Fauna

| Drawn: DL / CJT | Approved: KD | Date: 20/01/2011 | Figure: 6 | Rev. F |
|---|---|---|---|---|
| Job No.: 42907132 | File No.: 42907132-SUS-204_RF.mxd | | | A3 |

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Motion-sensitive cameras and searching along breakaways

There is potential for the Black-flanked Rock-Wallaby and Long-tailed Dunnart to occur in breakaway country to the north and south of the Project area (see Figure 6). The breakaway country to the north and east is known as the Barr Smith Range. Both species are difficult to detect but can be recorded using motion-sensitive cameras. These operate in daylight or at night, and were set in suitable habitat with universal bait (rolled oats, peanut paste and sardines) within the detection zone. Table 5 provides the locations and dates of motion sensitive camera surveys, including a camera set on a burrow system of the Brush-tailed Mulgara. Figure 6 indicates the location of motion sensitive cameras within the study area and the Barr Smith Range.

**Table 5. Motion sensitive camera survey locations and periods.**

| Motion sensitive camera | Habitat | Zone | Easting | Northing | Comments / Survey Nights |
|---|---|---|---|---|---|
| 1 | Breakaway Cave | 51J | 247522 | 6984286 | 5 nights |
| 2 | Breakaway Cave | 51J | 247522 | 6984286 | 10 nights |
| 3 | Waterhole / Gully | 51J | 249744 | 6979810 | 10 nights |
| 4 | Granite Outcrop | 50J | 794326 | 6996916 | 5 nights |
| 5 | Spinifex Sandplain | 51J | 206575 | 6981657 | Placed at Mulgara burrow system, 3 nights |

In addition to the use of cameras, searching along breakaways was undertaken to look for the distinctive scats (droppings) of the Black-flanked Rock-Wallaby. Areas where searching was carried out are indicated on Figure 6. Search areas included a length of *ca.* 13 km from (51J) 246094E, 6986988N (location of a large gnamma hole) to (51J) 249760E, 6979813N in July 2009, and searches at specific locations as listed below.

- Proposed Quarry (50J, 793832E, 6997685N)
- North Breakaway (50J, 793078E, 7004956N)
- Rock Wallaby Cave (51J, 247522E, 6984286N)
- Breakaway (51J, 248783E, 6981306N)
- Breakaway / Gorge (51J, 249744E, 6979810N)
- Logan Spring (51J, 252334E, 6974639N)

### 2.8.3 Bat surveys

Bats were surveyed by using the Anabat detector and by trapping using Harp traps (Figure 6, Table 6). Echolocation calls were recorded using the Anabat system (Titley Electronics, Ballina, NSW), where calls were recorded through the Anabat II Bat Detector onto an audio recorder. At a later stage the recorded calls were assessed using Anabat software to analyse the call characteristics. Characteristics used in call analysis included:

- Fmax Maximum call frequency (kHz)
- Fc Characteristic frequency (kHz)
- Fpeak Frequency with peak number of cycles (kHz)
- DUR Duration of call (ms)

In March and November 2009, Anabat detectors and Harp traps were placed at several locations within the Project area and along a breakaway associated with the Barr Smith Range, approximately 40 km east of the resource (Figure 6). These locations were chosen as they were considered places where bats would concentrate, e.g. sources of permanent water. Table 6 presents the locations and dates of each bat survey using Anabat detectors and/or Harp traps.

**Table 6. Bat survey locations, dates and survey technique. Zone 50J unless otherwise indicated.**

| Location | Easting | Northing | ANABAT Units | | Harp Traps | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 2-bank | 3-bank |
| March 2009 | | | | | | |
| Yeelirrie Homestead | 806209 | 6978391 | 23-26/03/2009 | 27-29/03/2009 | 23-29/03/2009 | - |
| Afghan Well (51J) | 245840 | 6983020 | 27/03/2009 | - | - | 27/03/2009 |
| Breakaway (51J) | 250331 | 6974833 | 28/03/2009 | - | - | - |
| Rubble Bore | 782841 | 6997710 | 29/03/2009 | - | - | - |
| November 2009 | | | | | | |
| Yeelirrie Homestead | 806209 | 6978391 | 5/11-8/11/2009 | 9/11/2009- | - | 5/11-8/11/2009 |
| Fauna Site 1 | 787620 | 6990787 | 6/11/2009 | 5/11/2009 | 6/11-9/11/209 | - |
| Gnamma Hole | 782338 | 6992651 | 8/11/2009 | 8/11/2009 | - | - |
| Mulga woodland near Site 10 | 782902 | 7001128 | -9/11/09 | 6/11/2009 | - | 7/11-9/11/2009 |
| Corner near Fauna Site 11 | 788172 | 6991689 | - | 5/11/2009- | - | - |

### 2.8.4 Spotlighting

Spotlighting was conducted both on foot, using head-torches (referred to as head-torching), and from the vehicle using the vehicle headlights and a hand-held spotlight. Where necessary, animals were captured for identification purposes and then released. Spotlighting was conducted during both the March and November 2009 surveys when conditions were most suitable.

### 2.8.5 Opportunistic surveys

During all site visits, observations of fauna were noted when they contributed to the accumulation of information on the fauna of the site. These included casual observations such as birds or reptiles seen while travelling through the site, and opportunistic searching for fauna, such as raking through leaf-litter and turning over logs.

Targeted opportunistic surveys outside the Project area were conducted in March 2009 (see Table 7 and Figure 6) and focused on fauna habitats not represented in the trapping survey sites. This ensured all major fauna habitats within the vicinity of the Project area were sampled to some extent. Opportunistic surveys included searching for evidence of conservation significant species and micro-habitat searching. Photographs of opportunistic survey sites are given in Section 3.2.

**Table 7. Location of opportunistic surveys in March 2009**

| Site | Easting | Northing | Zone | Habitat / Comments |
|---|---|---|---|---|
| Barr Smith 1* | 247522 | 6984285 | 51J | Breakaway |
| Barr Smith 2* | 250269 | 6975009 | 51J | Breakaway, Granite Outcrops |
| Afghan Well | 245840 | 6983020 | 51J | Granite Outcrops, Freshwater Soak |
| Dune 1 | 762753 | 7008929 | 50J | Sand Dune, Day survey and Spotlight |

* Indicates breakaway areas which were revisited in July 2009 to search for the Black-flanked Rock-Wallaby.

## 2.9 Limitations

The EPA Guidance Statement 56 (EPA 2004) outlines a number of limitations that may arise during surveying. These survey limitations are discussed in the context of BCE fauna surveys at the Yeelirrie project in Table 8.

**Table 8. Survey limitations as outlined by EPA (2004)**

| EPA Limitation | BCE Comment |
|---|---|
| Level of survey. | Level 2 (reconnaissance survey, detailed survey and targeted survey). Survey intensity was deemed adequate to identify significant fauna and habitats occurring in the Project area. |

| EPA Limitation | BCE Comment |
|---|---|
| Competency/experience of the consultant(s) carrying out the survey. | Bamford Consulting Ecologists has been undertaking work of this nature since 1989. All field-workers involved in this project have had extensive experience (more than ten years) in conducting fauna assessments. |
| Scope. (What faunal groups were sampled and were some sampling methods not able to be employed because of constraints?) | Birds, mammals, reptiles and frogs sampled. Bats were sampled using Anabat detectors and harp traps. Targeted surveys for Malleefowl, both Crest-tailed and Brush-tailed Mulgara species and Black-flanked Rock-Wallaby conducted in areas of suitable habitat. No constraints limited sampling. |
| Proportion of fauna identified, recorded and/or collected. | All vertebrate fauna observed were identified. Some skinks vouchered with the Western Australian Museum:<br>*Menetia greyii* R139490 and R139491 collected in March 2009,<br>*Menetia greyii* (F) R169916 (November 2009)<br>*Ctenous hanloni* R169917 (November 2009). |
| Sources of information e.g. previously available information (whether historic or recent) as distinct from new data. | Sources include previous reports on the fauna of the region (BCE); databases (BA, DEC, WAM, EPBC and BCE). Also fauna surveys conducted at Wanjarri Nature Reserve (DEC) and fauna records from Yeelirrie Station (anon, 1978). |
| The proportion of the task achieved and further work which might be needed. | Level 2 Survey complete. Due to survey findings further work may be needed to monitor mining impacts on significant fauna and habitats. Impacts are discussed within the *Fauna Asessment of the Yeelirrie Project: Impact Assessment Report* (BCE 2010) |
| Timing/weather/season/cycle. | Site reconnaissance conducted February 2009. Detailed field surveys conducted March 2009 and November 2009. Targeted surveys for conservation significant fauna conducted July 2009 and May 2010. Despite some rain in spring 2009, conditions were generally dry, which may have affected the presence and/or abundance of some species. However, it is the nature of arid and semi-arid environments that some species are nomadic or episodic. |
| Disturbances (e.g. fire, flood, accidental human intervention etc.), which affected results of survey. | No disturbances affected the survey. |
| Intensity. (In retrospect, was the intensity adequate?) | Survey intensity adequate to record conservation significant fauna and habitats. |

| EPA Limitation | BCE Comment |
|---|---|
| Completeness (e.g. was relevant area fully surveyed). | Field survey complete but as noted above, it is the nature of arid and semi-arid environments that some species are nomadic or episodic. Some species not recorded may be present under different conditions, but the habitat assessment allows such species to be considered. |
| Resources (e.g. degree of expertise available in animal identification to taxon level). | All vertebrate species identified to species (sometimes sub-species) level. All staff are trained and deemed competent to conduct animal identification to taxon level. |
| Remoteness and/or access problems. | No access problems. |
| Availability of contextual (e.g. biogeographic) information on the region. | Extensive regional (e.g. BCE database) information was available and was consulted. |

# 3. Results

## 3.1 Meteorological Conditions during Field Surveys

Meteorological data for the survey were taken from the Bureau of Meteorology (BOM) station at Yeelirrie (BOM 2010). The first detailed field survey was conducted from the 22 to 30 March 2009. During this period the weather was warm with no rainfall. The daily maximum temperature recorded during this period ranged from 30.8°C to 39.5°C, with daily minima ranging from 13.8°C to 24.4° C. The second field survey was conducted from 17 to 22 July 2009, when conditions were fine but cool, with cold nights and no rainfall. Mean daily data for this period are not available, but mean maximum and minimum temperatures for the month of July 2009 are 19.3°C and 5.6°C respectively.

A third detailed field survey was conducted from the 2 to 11 November 2009. During this period the weather was warm with rainfall occurring on several days. The daily maximum temperature recorded at the Yeelirrie BOM station during this period ranged from 28.3°C to 39.7°C (mean of 35.1°C), with daily minima ranging from 12.5°C to 22.5° C (mean of 17.8°C). Only one mm of rainfall was recorded at Yeelirrie during this period. The fourth survey was conducted from 5 to 10 May 2010. This targeted survey was conducted during cooler conditions with no rainfall. Rainfall (approximately 80 mm) had occurred in the months prior to the survey and as a result many Acacia and *Eremophila* species were in flower. The mean daily maximum and minmum temperatures recorded during the survey period were 26.8°C and 7.5°C respectively.

## 3.2 Fauna Habitats

Eight major fauna habitats were identified during field investigations (Figure 5 and 6). From an elevation of high to low in the landscape, these were:

- **Granite Outcro ps a nd Breaka ways**. Gravelly/sandy soils around, supporting mixed shrubland. Some areas of chenopod shrubland on heavier soil also present. Land Types 3 and 4.

- **Hardpan Mulga**. Mulga woodland with poorly-developed understorey on hard loam soils. Land Types 11 and 14.
- **Calcrete**. Low calcrete rises with Eucalypt open woodland (variable) over a sparse shrubland. Possibly consistent with Land Types 15 and 18 and the Mileura Land System, but generally non-saline.
- **Calcrete Outwash**. Clayey-loam and clay flats, subject to occasional inundation with some open claypans. Includes fringes of saline playa systems. Vegetation includes Acacia open shrubland, sometimes with thickets of *Melaleuca xerophila*, and chenopod shrub-heaths. Possibly consistent with the Land System Melaleuca.
- **Chenopod Shrubland over Sandplain**. These shrublands occur in sandy soils on the margins of playas in the southeast of the project area.
- **Scattered Shrubs over Spinifex Sandplain**[1]. Sandplains supporting spinifex, scattered shrubs and open Acacia/Eucalypt woodland. Land Types 10, 12 and 13.
- **Mulga over Spinifex Sandplain**[1]. Mulga woodland over Spinifex on sandy-loam soils.
- **Acacia Woodland over Sparse Spinifex**[1]. Acacia woodland with Spinifex of variable density.

The fauna habitats correspond approximately with soil types (Blandford 2010) and the major vegetation groupings identified by Western Botanical (2010), but there are some inconsistencies where soils recorded on the surface during fauna habitat assessments differed from the main soil type identified in botanical surveys, and where vegetation structure crosses soils and vegetation type boundaries. Areas of each fauna habitat within the Project area are given in Table 9. Condition of habitat was generally good with low levels of weed invasion. Further information on weeds may be obtained from Western Botanical (2010).

[1] For the purposes of calculating the fauna habitat areas, fauna habitat categories with spinifex in common were grouped into one category: Mixed shrubs over Spinifex sandplain

**Table 9. Areas of fauna habitat within the Project Area**

| Habitat type | Project area (ha) |
|---|---|
| Granite Outcrops and Breakaways | 1,866 |
| Mixed Shrubs over Spinifex Sandplain* | 69,840 |
| Hardpan Mulga | 21,230 |
| Calcrete | 2,819 |
| Calcrete Outwash | 3,095 |
| Chenopod Shrubland over Sandplain | 1215 |
| Bare and disturbed (not considered further in this study) | 150 |

* Three fauna habitats not clearly defined by vegetation types so combined for the purposes of area calculation; all have spinifex in common.

The Granite outcrops and breakaways include the Barr Smith Range to the north and east of the Project area, and similar landforms to the south. They are very extensive, linear habitats that are mostly distant from the Project area, however a site located in the proposed quarry, approximately 10 km north of the resource, was surveyed, adjacent to the Barr Smith Range. The three habitats that contain spinifex are very extensive both within and outside the study area, while the Hardpan Mulga has a more limited distribution in the study area. The two calcrete habitats (Calcrete and Calcrete Outwash) are smallest in area and are concentrated in the resource and adjacent areas.

Some fauna habitats in the study area, particularly the Calcrete and Calcrete Outwash, appear to be distinctive in a regional context, e.g. they differ from those in the nearby Wanjarri Nature Reserve where sandy soils are much more extensive. The Calcrete and Calcrete Outwash habitats seem to be poorly-represented outside the resource and adjacent areas.

Photographs and descriptions of vegetation type at each survey site are presented in Plates 1 to 15 below. Photographs of habitats that were surveyed opportunistically or targeted for conservation significant fauna surveys are presented in Plates 16 to 22. Vegetation communities as defined by Western Botanical (2010) are given in parentheses and presented in Table 4. Fauna habitats as defined above are given in bold.

**Plate 1. Site 1** : *Eucalyptus gypsophila* woodland on calcrete rise (CEgW vegetation community) **- Calcrete**

**Plate 2. Site 2**: Chenopod type vegetation comprising *Maireana pyrimidata* and *Atriplex* sp. Yeelirrie Station shrubland on self-mulching clays in drainage depression (CMpS and CApS vegetation communities). **– Calcrete Outwash**

**Plate 3. Site 3** : *Melaleuca xerophila* open woodland over clay/clay loam flats (CMxS vegetation community). – **Calcrete Outwash**

**Plate 4. Site 4**: Mulga (*Acacia aneura*) woodland with a sparse shrub understorey on sandy loam/clay loam (PLAPoS vegetation community). – **Hardpan Mulga**

**Plate 5. Site 5**: Mulga (*A. aneura*) woodland over Spinifex (*Triodia basedowii*) on loamy sand (SAMU vegetation community). – **Mulga over S pinifex Sandplain**

**Plate 6. Site 6** : Mulga (*A. aneura*) woodland over *Eremophila forrestii* subsp. *forrestii* on loamy sand (HPMS vegetation community). – **Hardpan Mulga**

**Plate 7. Site 7**: Mulga (*A. aneura*) woodland over Spinifex (*T. basedowii*) on loamy sand (SAMU vegetation community). – **Mulga over Spinifex Sandplain**

**Plate 8**. **Site 8**: *E. gypsophila* woodland and *Acacia burkittii* shrubland with patches of *Casuarina pauper* on orange clay loam with calcrete (CEgW and CAbS vegetation communities). - **Calcrete**

**Plate 9. Site 9**: Spinifex (*T. basedowii*) hummock grassland with scattered low *Acacia spp.* shrubs on sandplain (SAWS vegetation community). – **Scattered Shrubs over Spinifex Sandplain**

**Plate 10. Site 10**: Spinifex (*T. basedowii*) hummock grassland with Mallee (*Eucalyptus spp*.) and scattered low shrubs on sandplain (SAMA vegetation community). – **Scattered Shrubs over Spinifex Sandplain**

**Plate 11. Site 11** : Mixed *E. gypsophila* and *Casuarina pauper* woodland over open *Acacia burkittii* shrubland on stony calcrete clay, with very sparse groundlayers (CEgW, CCpW and CAbS vegetation communities). - **Calcrete**

**Plate 12. Site 12**: *Lycium australe* shrubland on flats with variable clay content and some stoney calcrete (CLaS vegetation community). – **Calcrete Outwash**

**Plate 13. S ite 13**: *E. gypsophila* woodland over mixed *Acacia* spp. and *Senna artemisioides* subsp. *filifolia* shrubland on stoney calcrete clay/loam (CEgW vegetation community). – **Calcrete**

**Plate 14. Site 14**: Mulga (*A. aneura*) woodland over Spinifex (*T. basedowii*) on red sandy loam (SAMU vegetation community). – **Acacia Woodland over Sparse Spinifex**

**Plate 15. Site 15**: *Acacia effusifolia* shrubland over Spinifex (*T. basedowii*) hummock land on red sandy loam (SAWS vegetation community). – **Acacia Woodland over Sparse Spinifex**

**Plate 16. Barr Smith Range: Breakaway.** Vegetation includes Acacia shrublands and scattered *Callitris columellaris*. Numerous caves, rock crevices and small cliffs occur along the Barr Smith Range. Some scattered rock holes (waterholes) also occur in protected parts of the range. **– Granite Outcrops and Breakaways**

**Plate 17. Barr Smith Range:** Waterholes along major creeklines. Some of these may be permanent and support Eucalypt stands. – **Granite Outcrops and Breakaways**

**Plate 18. Barr Smith Range: Granite outcrops.** Large granite hills occur on the flanks of the Barr Smith Range. Areas of outcropping include large, extensive rock piles. – **Granite Outcrops and Breakaways**

**Plate 19. Quarry site.** Low shrubland located just downslope of granite breakaway in quarry site. – **Granite Outcrops and Breakaways**

**Plate 20. Closed Acacia shrubland and Mallee.** Areas of closed Acacia shrubland and closed Mallee occur to the north of the Deposit. – **Hardpan Mulga**

**Plate 21. Gnamma holes amongst granite outcropping.** A small number of gnamma holes occur amongst granite outcropping at 50J, 782338E, 6992651N and at 782457E, 6992593N. – **Granite Outcrops and Breakaways**

**Plate 22. Claypans with fringing Melaleuca shrubland.** A series of freshwater claypans occur within the vicinity of the Deposit including at 50J, 782077E, 6993973N. This claypan holds water seasonally and would be seasonally significant for waterbirds. Skeletal remains of a number of waterbirds were found. – **Calcrete Outwash**

## 3.3 Vertebrate Fauna Assemblage

Vertebrate fauna species expected to occur in the region based upon the desktop review and those recorded during field investigations are presented in Appendix 3. The composition of vertebrate fauna expected to occur in the region and recorded within the study area is outlined in Table 10. The vertebrate fauna assemblage is expected to be composed of 292 species, including: 10 frog, 88 reptile, 155 bird, 31 native mammal and eight introduced mammal species. The field investigations confirmed the presence of 55% of these species (see Table 10). The expected fauna assemblage is substantially complete. Locally extinct species are listed in Appendix 3.

Thirty-five of the species expected to occur in the region are of conservation significance. Some species, such as the Greater Bilby, are unlikely to be extant within the region but have been included in species lists based on previous records, distribution and suitable habitat. The presence of eight of the conservation significant species was confirmed.

**Table 10. Composition of vertebrate fauna expected to occur within the Project area and recorded during BCE surveys (March, July and November 2009 and May 2010).**

| Taxon | Number of species expected | Number Recorded by BCE | Significant fauna Expected | | | Significant fauna recorded at Yeelirrie | | |
|---|---|---|---|---|---|---|---|---|
| | | | CS1 | CS2 | CS3 | CS1 | CS2 | CS3 |
| Fish | - | - | - | - | - | - | - | - |
| Frogs | 10 | 4 | - | - | - | - | - | - |
| Reptiles | 88 | 49 | 1 | - | 1 | - | - | - |
| Birds | 155 | 82 | 16 | 4 | 5 | 6 | 3 | 1 |
| Mammals | 31 native, 8 feral | 21 native, 4 feral | 3 | 3 | 2 | 1 | 2 | - |
| **Total** | **292** | **160** | **20** | **7** | **8** | **7** | **5** | **1** |

Overall, the assemblage of vertebrate fauna expected to occur reflects the transition zone from the Murchison to the arid interior. This assemblage contains both species typical of the Murchison area (e.g. Woolley's Pseudantechinus, Stripe-tailed Monitor)

and species typical of the central Deserts (e.g. Striated Grasswren, Great Desert Skink) and some more typical of the south-west (such as the Grey Currawong, Regent Parrot, Malleefowl). As a result, a diverse fauna assemblage is expected to occur within the study area where ranges of species with predominantly southern, eastern or northern distributions overlap. Consequently, some fauna species expected in the region occur near the extreme edge of their range.

The assemblage within each vertebrate class is discussed below, including background information on species of conservation significance. Conservation significant categories are defined in Appendix 2. Summary information on conservation significant species is presented in Table 11. Detailed results of fauna investigations in the field are considered in Section 3.4.

### 3.3.1 Freshwater fish

Freshwater fish are not expected to occur in the study area and this was confirmed during surveys. Permanent water does occur in some small springs and rock holes and surface water is present following rain, however these water sources are confined to playas or watercourses with very intermittent flows. The watercourses appear to flow only into salt lake systems with no external drainage. Additionally, these watercourses do not appear to link to more extensive systems that support fish, therefore, during high flows there is no evidence to suggest that fish would enter these seasonal playas and watercourses.

### 3.3.2 Amphibians

A total of 10 frog species may occur in the vicinity of the study area and the presence of four of these was confirmed (Appendix 3). No frogs of conservation significance are expected to occur.

### 3.3.3 Reptiles

A total of 88 reptile species may occur in the study area and the presence of 49 species (55%) was confirmed (Appendix 3). A further four species have previously been recorded at Yeelirrie (anon. 1978). Fifty-four reptile species have been recorded at Wanjarri Nature Reserve (DEC 2009), some 50 km east of Yeelirrie.

Only two species from the past surveys, expected to occur in the region are considered to be of conservation significance and are discussed below. They were not recorded during the BCE survey.

## Conservation Significance Level 1

### Great Desert Skink

The Great Desert Skink is listed as Vulnerable under the EPBC Act. It is a large, burrowing lizard, with a scattered distribution and restricted to sandplain and gravelly habitats in the western deserts region of central Australia (Species Bank 2009). It is known to have disappeared from former habitats, particularly in the Gibson Desert and Great Sandy Desert regions.

The Great Desert Skink occupies a variety of habitat types within the Western Desert region. They generally occur on hummock grass sandplains characterised by a dominant cover of Spinifex grasses *Triodia basedowii* and *T. melvillei*. In the Tanami Desert and parts of the Great Sandy Desert, the Great Desert Skink also inhabits paleodrainage lines characterised by giant termite mounds and titree (*Melaleuca sp*.) shrubs (Species Bank 2009).

The decline of the Great Desert Skink has been attributed to altered fire regimes and predation by introduced predators (Species Bank 2009). The Great Desert Skink has been recorded from Wanjarri Nature Reserve (DEC 2009), but was not recorded in the current survey.

## Conservation Significance Level 3

### (New Legless Lizard) *Aprasia picturata*

This pygopod species has only been recently collected and described by Smith and Henry (1999) and is known only from the vicinity of Leonora and Wiluna. *Aprasia picturata* has only been recorded 35 km east of Leonora, and three and a half kilometres south of Minara Homestead (Smith and Henry 1999). At these locations, Smith and Henry (1999) recorded the species from a low greenstone ridge with pockets of sandy loam supporting a mixed Acacia shrubland and a low rocky ridge with sparse Acacia and *Eremophila* shrubs. It is considered conservation significant

due to its limited distribution and specialised habitat requirements (Wells 2007). It was not recorded in the current survey.

### 3.3.4 Birds

A total of 155 bird species may occur in the study area and the presence of 82 species (52%) was confirmed (Appendix 3). An additional 26 species previously recorded at Yeelirrie Station (anon. 1978), gives a total of 108 species (69% of those expected) recorded at Yeelirrie. Species recorded by anon. (1978) but not by BCE were mostly waterbirds, suggesting seasonal conditions differed between the two survey periods.

The list of bird species expected to occur within the study area includes 27 of conservation significance. These are discussed below. The Malleefowl, Peregrine Falcon, Bush Stone-curlew, Australian Bustard and Rainbow Bee-eater were the only conservation significant species recorded by BCE. Observations on these, including results of detailed surveys, are presented in Section 3.4.

At least one bird species, the Thick-billed Grasswren, is almost certainly regionally extinct (Blakers *et al.* 1984); a list of regionally extinct species appears in Appendix 3.

**Conservation Significance Level 1**

**Malleefowl**

The Malleefowl is listed as Vulnerable under the EPBC and Wildlife Conservation Acts. In Western Australia, Malleefowl occur mainly in scrubs and thickets of Mallee (*Eucalyptus* spp.), Boree (*Melaleuca pauperiflora M. sheathiana*), Bowgada (*Acacia ramulosa* var. *linophylla*) and also in other dense litter-forming shrublands including Mulga shrublands (*Acacia aneura*) (Johnstone and Storr 2004). It occurs across the southern part of Australia, with Yeelirrie probably close to the northern edge of its range. The species is threatened by the widespread clearing of habitat, habitat degradation (by fire and livestock) and fox predation.

Malleefowl have been previously recorded on Yeelirrie Station with 10 to 20 breeding pairs estimated to occur on the property (Benshemesh *et al.* 2008). The Benshemesh

data indicates Malleefowl are likely to be confined to Acacia shrublands on sanplain in higher landscapes. In the local area, Malleefowl have also been recorded from Wiluna, Mount Keith and Wanjarri Nature Reserve (DEC 2009). Benshemesh *et al.* (2008) considers the Yeelirrie population to be of high importance because it is one of the few examples known of a Malleefowl population in a low rainfall area. One inactive Malleefowl mound was recorded in *Acacia* woodland over sparse Spinifex during the BCE survey.

**Princess Parrot**

The Princess Parrot is listed as Vulnerable under the EPBC Act and as Priority 4 by DEC. This species occurs on red desert sandplains, dunes, along tree-lined watercourses and arid woodlands (DEC 2009). The Princess Parrot is highly nomadic, with its occurrence sporadic through the arid interior. This species has been recorded from Wanjarri Nature Reserve (DEC 2009), and may be a rare visitor to the study area where it may utilise the eucalylpt woodland for breeding.

**Slender-billed Thornbill**

The western sub-species of the Slender-billed Thornbill is listed as Vulnerable under the EPBC Act. The Slender-billed Thornbill occurs in shrubland, typically in areas of saltmarsh dominated by samphire (*Tecticornia* spp.), bluebush (*Maireana* spp.) or saltbush (*Atriplex* spp.) around salt lakes, or in low heath on sandplain (Pavey 2006). The species occurs in a number of disjunct populations in Western Australia, from Shark Bay to the Nullarbor (Johnstone and Storr 2004). The species is declining in much of its range owing to the degradation of chenopod vegetation by livestock and rabbits (Johnstone and Storr 2004) and is considered to be Regionally Extinct in the Northern Territory (Pavey 2006).

The Slender-billed Thornbill has been recorded from the region, from near Meekatharra and Mount Magnet (Birds Australia 2009). While there appears to be no resident population in the study area, there is likely to be a population within 30 km to 50 km. The species uses chenopod shrublands that are often associated with paleodrainage systems, and may utilise the chenopod shrublands of the study area as an irregular visitor.

**Peregrine Falcon**

The Peregrine Falcon is classified as Specially Protected Fauna under Schedule 4 (Other Specially Protected Fauna) of the Wildlife Conservation Act. Blakers *et al.* (1984) consider that Australia is one of the strongholds of the species, since it has declined in many other parts of the world. The Peregrine Falcon lays its eggs in recesses of cliff faces, tree hollows or in large abandoned nests of other birds (Birds Australia 2009), and pairs maintain a home range of about 20 to 30 $km^2$ throughout the year. The species has a known distribution throughout Australia. The Peregrine Falcon has been recorded from Yeelirrie Homestead and from Wanjarri Nature Reserve (Birds Australia 2009), and was recorded from the Barr Smith Range in the BCE survey.

**Major Mitchell's Cockatoo**

Major Mitchell's Cockatoo is listed under Schedule 4 (Other Specially Protected Fauna) of the *Wildlife Conservation Act.* This species is sporadically distributed through arid and semi-arid Australia and may occur in woodland, sparsely timbered grasslands and shrublands, and rocky outcrops (DEC 2009). The Major Mitchell's Cockatoo has previously been recorded at Yeelirrie Station, where a small flock was seen in Mulga shrubland within the study area (anon. 1978).

**Migratory Species:**

Eastern Great Egret
Marsh Sandpiper
Common Greenshank
Wood Sandpiper
Common Sandpiper
Black-tailed Godwit
Red-necked Stint
Sharp-tailed Sandpiper
Curlew Sandpiper
Fork-tailed Swift
Rainbow Bee-eater

The above 11 species are listed as Migratory under the EPBC Act. The species and associated habitat covered under JAMBA are also protected under Schedule 3 of the Wildlife Conservation Act (see Table 11). Nine of these species are waterbirds that are occasionally recorded in small numbers and occur throughout inland Australia. This includes a previous record of the Sharp-tailed Sandpiper at Yeelirrie (anon. 1978).

Two of the migratory species, the Fork-tailed Swift and Rainbow Bee-eater, are land birds. The Fork-tailed Swift is a non-breeding summer visitor to Australia, with records widespread but biased by observer distribution (Higgins 1999). The Swift is an almost exclusively aerial species largely independent of terrestrial habitat types. It was previously recorded above playas surrounded by *Melaleuca xerophila* near the resource and surrounds (anon. 1978).

The Rainbow Bee-eater occurs year-around in the tropics of northern Australia and Indonesia with a southward migration to both south-eastern and south-western Australia in early spring. Southern birds return north in autumn (Johnstone and Storr 1998). It nests in burrows dug usually at a slight angle in flat ground, gently elevated slopes, sandy banks or cuttings, and often at the margins of roads or tracks. It has been previously recorded within the study area (Birds Australia 2009) from spinifex grassland with emergent trees and from *Eucalypt* woodland associated with the resource area and surrounds. When present, the Rainbow Bee-eater is common and prominent in natural and altered environments. Although a species of high conservation significance, it is abundant and versatile in its selection of nest sites.

**Conservation Significance Level 2**

**Bush Stone-curlew**

The ground-dwelling Bush Stone-curlew is listed as Priority 4 by the DEC and Near Threatened by Garnett and Crowley (2000). The Bush Stone-curlew inhabits lightly timbered open woodlands (DEC 2009) and dense Acacia shrublands including along drainage lines (J. Turpin, pers. obs.) and occurs throughout Australia. It is also known to occur in dense Acacia shrublands on Banded Ironstone ridges such as at Weld Range (J. Turpin and M. Bamford, pers. obs.). This species has suffered a significant

population decline and is now sparsely distributed in the southern parts of Western Australia (Birds Australia 2009). It was recorded in Hardpan Mulga, Calcrete and in the Barr Smith Range (Granite Outcrops and Breakaway habitat) in the current survey (see Section 3.4.3).

**Grey Falcon**

The Grey Falcon is classified as Priority 4 by the DEC and Near Threatened by Garnett and Crowley (2000). This species appears to have a distribution centred around ephemeral or permanent drainage lines throughout inland Australia, utilising old nests of other species situated in the tallest trees along the river systems (Garnett and Crowley 2000). The Grey Falcon has been recorded in the region, from near Meekatharra and Wiluna (Birds Australia 2009), but was not recorded in the current survey.

**Australian Bustard**

The Australian Bustard is classified as Priority 4 by the DEC and Near Threatened by Garnett and Crowley (2000). This species is associated with a variety of grassland, grassy woodland and shrubland habitats across Australia, but has declined in the south. The main threats to its survival are a combination of habitat loss/degradation and predation by introduced fauna (e.g. feral Cats and Foxes). The Australian Bustard has been previously recorded from Yeelirrie Station and also at Wanjarri Nature Reserve. Evidence of this species was recorded throughout the study area in all fauna habitats.

**Striated Grasswren**

The sandplain sub-species of the Striated Grasswren is listed as Priority 4 by DEC and near threatened by Garnett and Crowley (2000). This subspecies has disappeared from the southern fringes of its historical range, being listed by Birdlife International as the Western Central and Southern Inland Australia (BirdLife International 2009), and has declined in density over the remainder of its range (Garnett and Crowley 2000). Striated Grasswrens occur on sandplains dominated by mature *Triodia* hummock grassland with an overstorey of shrubs, usually mallee eucalypts. Fire is recognised as a major threat throughout this sub-species' range (Garnett and Crowley 2000). The Striated Grasswren has been recorded from the Wanjarri Nature Reserve, but was not recorded during the current survey.

**Conservation Significance Level 3**

**Square-tailed Kite**

**Scarlet-chested Parrot**

Both the Scarlet-chested Parrot and Square-tailed Kite are listed as Threatened (Least Concern) under the Action Plan for Australian Birds (Garnet and Crowley 2000). The Square-tailed Kite is sparsely distributed over much of the Australian mainland, with a few scattered records from the region (Birds Australia 2009). The Square-tailed Kite is a specialised predator of small birds taken from the canopy, foraging primarily over forest, woodland, mallee and heath (Garnett and Crowley 2000). This species has previously been recorded at Yeelirrie Station (anon. 1978), but was not recorded in the current survey.

The Scarlet-chested Parrot has declined over much of its range, formerly occurring across the Murchison and into the south-west of Western Australia. This species has also declined in the Goldfields (Garnet and Crowley 2000). Most recent records for the Scarlet-chested Parrot come from arid inland Australia including the Great Victoria Desert. This species has been recorded from the Wanjarri Nature Reserve, but was not recorded in the current survey.

**Regent Parrot**

The Regent Parrot has been identified by Saunders and Ingram (1995) as one of a number of south-west Australian woodland bird species recognised as declining. It is at the extreme north of its range in the region and is a rare visitor to Wanjarri Nature Reserve. It was not recorded in the current survey.

**Rufous-crowned Emu-wren**

The Rufous-crowned Emu-wren has a fragmented population in northern and central Australia and is generally uncommon. In general, the species is patchily distributed and within Wanjarri where it has been recorded (Species Bank 2009), it is near the limit of its range. The Rufous-crowned Emu-wren is associated with spinifex, particularly tall, dense and long-unburnt mature hummock grasslands. It was not recorded in the current survey.

**Grey Honeyeater**

The Grey Honeyeater is uncommon throughout the Murchison and Pilbara, being recorded from a few, scattered localities (Birds Australia 2009). This species inhabits *Acacia* woodlands and shrublands, particularly those dominated by Mulga (*Acacia aneura*), across arid central Australia. The Grey Honeyeater has been recorded at Wanjarri Nature Reserve (Species Bank 2009). It was not recorded in the current survey.

### 3.3.5 Mammals

A total of 39 mammal species may occur in the study area, including 31 native and eight introduced species. Of these, the presence of 25 species (21 native species being 67% of the native species expected) was confirmed (Appendix 3). Appendix 8 presents the results of the Anabat recordings and Harp trap captures of bats.

The list of mammal species expected to occur within the study area includes six of conservation significance. These are discussed below. The Brush-tailed Mulgara, Black-flanked Rock-Wallaby and Inland Long-eared Bat were the only conservation significant species recorded by BCE. Observations on these, including results of detailed surveys, are presented in Section 3.4.

At least seven mammal species are almost certainly regionally extinct; a list of regionally extinct species appears in Appendix 3.

**Conservation Significance Level 1**

**Crest-tailed Mulgara**

There are currently two recognised species of mulgara, the Crest-tailed Mulgara and the Brush-tailed Mulgara. Due to recent re-classifications there is some confusion in museum records and under legislation between these. For most of the last 30 years only the Crest-tailed Mulgara was recognised. More recently, Woolley (2005, 2006) re-assigned the species to the Brush-tailed Mulgara and Crest-tailed Mulgara. The historical taxonomic confusion means that the distribution of the two mulgara species is unclear (Woolley 2005, 2008) and even museum specimens need to be reviewed. However, both species have suffered significant population reduction and fragmentation over the past 80 years (Woolley 2008).

The Crest-tailed Mulgara is listed as Vulnerable under the EPBC and Wildlife Conservation Acts. It occurs primarily in Sandhill Canegrass (*Zygochloa paradoxa*) dominated dunes, Nitre Bush (*Nitraria billardierei*) grasslands, and Sandhill Canegrass flats near salt lakes (Woolley 2008), and is known with certainty from some of the desert regions along the border between the Northern Territory and South Australia. The status of the species in Western Australia is unclear, while NatureMap has distinguished between the two species of mulgara, the identification of records has yet to be fully resolved. Department of Environment, Water, Heritage and the Arts (DEWHA) has not yet updated the EPBC Act 1999 database and this does not currently distinguish between the two species, listing only the Crest-tailed Mulgara. The species was not recorded in the current survey. The Brush-tailed Mulgara is discussed below (under Conservation Significance Level 2).

**Greater Bilby**

The Greater Bilby is listed as Vulnerable under the EPBC and Wildlife Conservation Acts. The species formerly utilised a wide range of habitat types across the continent. Extant populations are restricted to a variety of "tall shrublands, open woodlands, hummock grasslands and sparse forblands" (Maxwell *et al.* 1996). Threats to the

species are much the same as those affecting mulgara (see above), e.g. altered fire regimes, introduced grazers and predators. The species appears to remain widespread in the Great Sandy Desert (M. Bamford pers. obs.) and scattered populations occur across the northern Pilbara. In the Great Sandy Desert, the species appears most common in Acacia shrublands associated with paleodrainage lines, where the soils are sandy loams. The Greater Bilby was recorded near Wiluna and Leinster in 1981 (DEC Threatened Species Database 2008) but its status in the region of the study area is uncertain. It was not recorded in the current survey.

**Black-flanked Rock-Wallaby**

The Black-flanked Rock-Wallaby is listed as Vulnerable under the EPBC Act and Threatened (Schedule 1) under the *Wildlife Conservation Act*. It has declined over much of its range and now occurs in only a few scattered populations across in Western Australia, with very few known from the arid zone. These include a population east of the Fortescue River Roadhouse (Pilbara), in Cape Range, Ningaloo Station, Calvert Range (status uncertain), Durba Hills (status uncertain) and historic records from Weld Range and Mt Farmer near Cue (DEC 2009).

The main factors threatening Rock-Wallaby populations are predation from introduced predators, competition and habitat degradation due to introduced herbivores and over-abundant native herbivores and habitat degradation due to changed fire regimes (Species Bank 2009).

There are anecdotal accounts of Rock-Wallabies in the Barr Smith Range near the study area from DEC (M. Cowan pers. comm.), former residents of Yakabindie Station, and a sighting of two animals thought to be Rock-Wallabies in 2004 (G. Cockerton pers. comm.). Scats of the species, thought to be less than 5 years old, were recorded in the Barr Smith Range in the current survey.

**Conservation Significance Level 2**

**Brush-tailed Mulgara**

The Brush-tailed Mulgara is listed as Priority 4 by DEC. It has recently been separated from the similar Crest-tailed Mulgara as discussed above. The Brush-tailed

Mulgara can be separated from the Crest-tailed Mulgara on the basis of the following characteristics (Woolley 2005, 2006):

- appearance of black hairs on the distal half of the tail (a brush in the Brush-tailed Mulgara versus a dorsal crest in the Crest-tailed Mulgara);
- the number of upper pre-molar teeth (two in the Brush-tailed Mulgara versus three in the Crest-tailed Mulgara); and
- in females, the number of teats (six in the Brush-tailed Mulgara versus eight in the Crest-tailed Mulgara).

The Brush-tailed Mulgara is widely distributed in arid regions of the central and western parts of the country (Woolley 2008). It occurs in scattered populations at fairly low density, but may be locally abundant. The density of Brush-tailed Mulgara populations fluctuates depending on long-term climatic conditions and is also sensitive to fire (Woolley 2008). This species occupies spinifex (*Triodia* spp.) grasslands, and burrows in flats between sand dunes.

The Brush-tailed Mulgara has been recorded at Mount Keith and at the Wanjarri Nature Reserve, and is also associated with the Bullimore Land System (EPA 1996), which occurs throughout the Project area. This species was recorded in high abundance throughout Scattered Shrubs over Spinifex Sandplain habitat both within and adjacent to the study area.

**Long-tailed Dunnart**

The Long-tailed Dunnart is listed as Priority 4 by the DEC. The species appears to be a specialist of rocky habitats and has a probably fragmented distribution from the Pilbara and northern Murchison into the southern Northern Territory and northern South Australia (van Dyck and Strahan 2008). Possible threats include habitat alteration due to introduced herbivores e.g. cattle and rabbits, inappropriate fire regimes, invasion by buffel grass, and predation by cats and foxes (Pavey 2006). The Long-tailed Dunnart has been recorded approximately 100 km north-east of Wiluna (DEC 2009). Suitable habitat is present along the Barr Smith Range, but it was not recorded in the current survey.

**Inland Greater Long-eared Bat**

The inland sub-species of the Greater Long-eared Bat is listed as Priority 4 by the DEC. Its distribution is poorly-known, but populations occur in the Dundas, Jilbadji and Mt Manning Nature Reserves in Western Australia, and on several Conservation Parks in South Australia (DEWHA 2009b). It was recorded in the current survey.

**Conservation Significance Level 3**

**Kultarr**

The Kultarr occurs across central Australia extending into the Murchison. It prefers stoney, granitic plains dominated by *Acacia*, *Eremophila* and *Senna* shrublands (Strahan 1995). The Kultarr is uncommon over most of its range, and populations appear to fluctuate seasonally (Strahan 1995). Some eastern populations are now considered extinct. The Kultarr appears to occur sporadically across the Murchison and has been recorded at Wanjarri Nature Reserve (DEC 2009). It was not recorded in the current survey.

**Desert Mouse**

The Desert Mouse is a medium sized rodent (15 – 30 g) that has a widespread distribution throughout the arid zone of Australia (Menkhorst and Knight 2001). It is considered locally abundant in habitats containing samphire, sedge, nitrebush or mature spinifex grasslands (Alpers *et al.* 2003). The distribution of the species once extended from the Murray-Darling through the Flinders Ranges to the Gibson and Great Sandy Deserts, to the west coast and onto Bernier Island (Read *et al.* 1999, Menkhorst and Knight 2001). Since European colonisation there has been a contraction of the species' range to the central deserts (Kerle 1995, Read *et al.* 1999).

In Western Australia, the Desert Mouse occurs in the Pilbara and the Central Deserts. At the south-western extreme of its distribution, records come from near Wanjarri Nature Reserve (DEC 2009), Leonora (M. Bamford and J. Turpin, pers. obs.) and from Queen Victoria Spring (DEC 2009). It was not recorded during the current survey.

## 3.4 Results of Field Investigations

### 3.4.1 Observations on the recorded vertebrate assemblage

The aim of field investigations is not simply to record species but to gather information about the species and their relationship with the environment of the site. However, the number of species recorded in relation to the number of species expected does give a measure of the completeness of the coverage of the fauna assemblage, which is important in order to be reasonably confident that significant species and/or patterns have not been overlooked. The number of species recorded (160 species by BCE and 30 additional species recorded at Yeelirrie previously (anon. 1978)) represents 54% and 65% respectively of the number of species expected (see Table 10). The coverage of vertebrate classes just by the BCE surveys was 40 %, 55%, 54% and 67% for frogs, reptiles, birds and native mammals respectively. Recording over half the expected species in one year of surveys in an annually variable, arid environment, and in a year without exceptional rain, is a high return. For example, How and Dell (1990) recorded only 75% of the 26 reptile species found across an intensive three year study in any one year in a stable, predictable and high rainfall environment close to Perth.

Among the frogs, the recorded species were found around Yeelirrie Homestead (Main's Frog, Water-holding Frog and Desert Tree Frog) and near rockholes in the Barr Smith Range (Desert Tree-Frog and Western Toadlet) outside the Project area. Conditions were not generally suitable for recording frogs during any of the field surveys. The species expected but not recorded are therefore very likely to be present. All frogs in the area require surface water (ephemeral or permanent) for breeding and may utilise pools ranging from flooded rockholes to riverine pools. The playa areas are likely to be important for frog breeding, as they are freshwater systems.

The reptile assemblage recorded in the region confirmed the presence of a wide range of species, with elements typical of the Murchison area, the central deserts and some more typical of the south-west. Some typically arid desert dwelling species were trapped at the Scattered Shrubs over Spinifex Sandplain sites including skink lizards *Ctenotus ariadnae*, *Ctenotus grandis* and *Lerista desertorum*; and the Long-nosed Delma, *Delma nasuta*. These species occur at Yeelirrie Station near the south-west

extreme of their range. Reptile species more typical of the south-west include the Woodland Dark-flecked Morethia and a blind snake, *Ramphotyphlops bicolor*. The latter record at Yeelirrie represents a small northward extension of the species' known range. Among the 35 species expected but not recorded, 10 are snakes, a group that is regularly undersampled in fauna surveys as many species are cryptic with short activity periods. The lack of significant rain during survey periods may have affected the number of snakes recorded. Other species are close to the limit of their range in the area and while the lack of records may mean they are not present, they may also occur in small numbers and therefore be hard to detect.

Records of the reptile assemblage displayed strong differences between fauna habitats and this is discussed in the following section.

As with the reptiles, the bird assemblage recorded included Murchison, desert and south-west elements. The percentage of expected birds recorded is sensitive to annual conditions, with very few waterbirds included in the surveys; waterbirds made up a high proportion of the species observed by anon. (1978) but not by BCE. There were also lower numbers of desert species than expected which probably reflects the lack of rainfall during the survey periods. However, the expected assemblage of birds also includes species that, because of their mobility, may be very infrequent visitors or even vagrants to the region. Like reptiles, the bird assemblage varied between fauna habitats and this is discussed in the following section.

Mammals were recorded at the highest rate and some groups were well-represented, e.g. nine species of bats were confirmed out of an expected assemblage of 11 species. Rodents were an exception, with only one of four species confirmed, but this probably reflects dry conditions, as rodent populations fall drastically under poor conditions. The expected mammal assemblage also includes a few species, such as the Crest-tailed Mulgara and Greater Bilby, which are of high conservation significance and for which regional records exist, although both probably no longer occur in the region of the Project area. During surveys, evidence of two locally extinct mammal species was found. Old warrens of the Boodie were found regularly on targeted significant fauna survey transects and in all habitats, although possibly with a concentration in Calcrete and Hardpan Mulga habitats. Old nests of the Lesser Stick-nest Rat were found in

small caves along the Barr Smith Range in the Granite Outcrops and Breakaways habitat.

### 3.4.2 Patterns of distribution and abundance

The trapping and censussing at the 15 systematic sampling sites provide measures of abundance, which make it possible to compare species richness and abundance between fauna habitat types. Trapping and censussing data are presented in Appendix 6, with results summarised in Tables 13 and 14. Systematic sampling sites are shown previously in Figure 5. With both trapping and censussing results, sampling effort varied and this needs to be considered when examining data. Numbers of captures and records for reptiles, mammals and birds have been standardised to allow overall abundance to be compared between sites. Sampling effort can have a great influence on numbers of captures and records, but less of an effect on species richness.

Numbers of captures of reptiles and mammals (Table 13) were greatest at Sites 9 and 10 in habitat described as Scattered Shrubs over Spinifex Sandplain. Reptiles were particularly rich at Site 9 (20 reptile captures/100 trapnights) which had been more recently burnt than Site 10 (13.1 reptile captures/100 trapnights). The Brush-tailed Mulgara was well-represented at Site 10 (13 of 14 individuals trapped and none at Site 9) which was long-unburnt, compared with the recently-burnt Site 9. The greater effort with Elliott traps did not affect reptile captures or the captures of other mammals such as the Ningaui, common at both Sites 9 and 10, but recorded in only small numbers at just two other sites. Several species were recorded only at Site 9 and/or Site 10, and are therefore probably confined to that habitat.

Sites in Calcrete, Hardpan Mulga and Mulga over Spinifex Sandplain habitats were broadly similar in numbers of captures and species, but there was considerable variation between the sites on Calcrete. Sites 1 and 8 exhibited a complex vegetation structure and areas of friable soils with leaf-litter, whereas Sites 11 and 13 were largely open shrublands with hard soils and little leaf-litter. This made a great difference to the numbers of captures and species recorded (16 and 16.4 reptile captures/100 trapnights at Sites 1 and 8 respectively, compared with 1.3 and 1.4

reptile captures/100 trapnights at Sites 13 and 11). Site 11 had the lowest number of reptile species recorded (2) of any site.

Calcrete Outwash (Site 2, 3 and 12) was poor in species, as was Acacia Woodland over Sparse Spinifex habitat (Site 14 and 15), even after allowing for the slightly lower trapping effort at these than at most other sites. Capture rates of reptiles were also low.

Bird censussing results also revealed some trends within and between habitats (Table 14). In this case, the two fauna habiats with Mulga (Hardpan Mulga and Mulga over Spinifex Sandplain) tended to have the greatest numbers of records and species, but one of the Calcrete sites, Site 1, had the greatest number of species and records, and the highest recording rate (6.3 records/day) of any single site. Site 1 occurs in well-developed woodland of *E. gypsophila* and several of the abundant bird species are known to be associated with this canopy, such as the Weebill, Striated Pardalote and Australian Ringneck (Higgins and Peter 2002, Higgins 1999). Other Calcrete sites, the Calcrete Outwash sites and the spinifex sandplain sites, had intermediate numbers of records and species. The Acacia Woodland over Sparse Spinifex was poorest in species and records.

### 3.4.3 Observations on conservation significant species

Of the 35 species of conservation significance expected to occur within the study area, eight species were recorded by BCE and a further five species had been recorded by anon. (1978) at Yeelirrie. All species are listed in Table 11, indicating their level of significance and those that were recorded. Table 11 also indicates the likelihood of their status in the study area and the likely significance of the proposed development for each species. These are important considerations, as while a species may be recorded, it is of little conservation significance if the recorded individual/s is only a vagrant. Table 12 indicates the preferred habitat of each conservation significant species and the extent of this habitat within the study area, including how they relate to fauna habitat categories, soil type (Blandford & Associates 2010) and vegetation type (Western Botanical 2010).

Even among species that were recorded, the significance of the resource and immediate surrounds is considered to be minor in most cases because the species are considered to be an irregular visitor (16 species), a resident but very widespread (e.g. Peregrine Falcon, Australian Bustard, Square-tailed Kite) or there is little if any habitat actually within the resource and immediate surrounds (eg. Great Desert Skink, the legless lizard *Aprasia picturata*, Long-tailed Dunnart, Kultarr). The Crest-tailed Mulgara probably does not occur in the region but taxonomic uncertainty means it cannot be excluded from this list, while the Greater Bilby is probably locally extinct, but there remains the possibility that a population persists somewhere in the general region. For both these species the significance of the study area is considered to be minor.

For six of the significant species, the study area may be of moderate importance. These are:

- Malleefowl - population known in region and considered to be significant by Benshemesh *et al.* (2008);
- Black-flanked Rock-Wallaby - population known in region;
- Slender-billed Thornbill - may be present in suitable chenopod shrubland;
- Brush-tailed Mulgara – large local population found by BCE (see below);
- Bush Stone-curlew –local population found by BCE, mostly in Calcrete and Hardpan Mulga habitat (see below); and
- Inland Greater Long-eared Bat – species found in area by BCE and suitable roosting habitat (tree hollows).

Except for the Slender-billed Thornbill, all these species were recorded during the BCE field investigations. The only other significant species recorded by BCE was the Peregrine Falcon (a single bird seen over the Barr Smith Range). Appendix 7 presents all records of significant species from the BCE surveys. Details of all records of these significant species are discussed below. Discussion on potential habitat for the Slender-billed Thornbill is also presented.

Bush Stone-curlew

The Bush Stone-curlew was recorded from three locations during the Yeelirrie surveys (see Figure 7 and Appendix 7). These records included tracks and response to

call playback and were made in November 2009 and May 2010, suggesting the birds are resident. Most of the records were north-west of the resource in Calcrete and Hardpan Mulga habitats, but there were also records from along the Barr Smith Range. The species has previously been recorded from Yeelirrie Station and from Wanjarri Nature Reserve (Birds Australia 2009).

Australian Bustard

These birds were seen infrequently (see Appendix 7), but fresh tracks were found throughout the study area, along targeted significant fauna survey transects, and in all fauna habitats including sand dunes. Recorded tracks are shown in Figure 7.

Peregrine Falcon

A single sighting of the Peregrine Falcon was made in the Barr Smith Range (Figure 7). Based on observations of habitat, the species is very likely to breed on a cliff ledge in the Barr Smith Range, and therefore the study area is probably within the foraging territory of this pair.

Rainbow Bee-eater

The species was recorded opportunistically throughout all habitats within the study, specifically in November 2009, and is probably breeding on the margins of some tracks in sandy-loam soil.

Malleefowl

One Malleefowl mound was recorded during the BCE surveys (Figure 7). A recently used mound (within previous 10 years) was recorded amongst closed Acacia shrubland on the northern sandplain, at 790 511E, 6 992 350N, approximately 2 km north of the resource area (Figure 7). The mound was constructed from sand and raised with a well defined central depression (see Plate 23 below). There was leaf-litter and egg shell fragments within the depression and the mound had been constructed over an old track. Despite the presence of this mound, there was no evidence of Malleefowl being present during the BCE surveys within the study area as the distinctive Malleefowl tracks were not found during the Malleefowl and Brush-tailed Mulgara transect surveys.

Benshemesh *et al.* (2008) reported on extensive surveys for Malleefowl mounds and found that all mounds were located in Acacia shrublands to the north and south of the BCE study area, above the granite breakaways. The species seemes to be most abundant high in the landscape in Acacia shrublands on gravelly, well drained soils. Locations of the transect surveys and mounds found by Benshemesh *et al.* (2008) are presented in Figure 7.

**Plate 23. Malleefowl mound recorded by BCE in the study area.**

Note the closed Acacia shrubland surrounding the mound. The mound was constructed from sand, with a diameter of approximately three metres. Egg shell fragments were found within the central depression indicating a successful and recent (approximately 10 years) breeding event.

760000 770000 780000 790000 210000 220000 230000 240000 250000

7010000 7000000 6990000 6980000 6970000 6960000

Australian Bustard tracks recorded

SANDSTONE WILUNA ROAD

MGA ZONE 50 MGA ZONE 51

Bush Stone-curlew response to call playback

Bush Stone-curlew call heard

Inset

Bush Stone-curlew tracks recorded

Barr Smith Range

Peregrine Falcon sighting

GOLDFIELDS HIGHWAY

ALTONA YEELIRRIE ROAD

WILUNA LEINSTER ROAD

S52 S56 S21 S22 S1 S91 S92 S2 S25 S20J S48 S14 S15 S18J S18 S10 S9 S32X S8 S31X S11J S12J S12A S3 S98 S94 S95 S96 S33X S16A S5 S34X S4 S17 S97 S27 S45 S46

Additional Malleefowl Preservation Group survey areas located approximately 8 km south of map extent

N

0 2 4 6 8 10

Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51

Source: Landsat, 2005

**Legend**

- Study Area
- Pit Outline
- Bamford Consulting Ecologists Targeted Significant Fauna Transect
- Inactive Malleefowl Mound
- Malleefowl Preservation Group Survey Area (Benshemesh *et al.* 2008)
- Malleefowl Mound

**Fauna Habitat derived from Western Botanical (Bamford, 2011)**

- Calcrete
- Calcrete Outwash
- Chenopod shrubland over sandplain
- Granite Outcrops and Breakaways
- Hardpan Mulga
- Mixed Shrubs over Spinifex sandplains

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Evidence of Malleefowl, Bush Stone-curlew, Australian Bustard and Peregrine Falcon

| Drawn: DL/CJT | Approved: KD | Date: 20/01/2011 | Figure: 7 | Rev. D |
|---|---|---|---|---|
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Slender-billed Thornbill

The Slender-billed Thornbill was not observed during field investigations but suitable habitat is present within the study area and region. Based on interpretation of vegetation types recorded by Western Botanical, the species may occur in some vegetation types in the Calcrete Outwash and Chenopod Shrubland over Sandplain habitats. Components of these three faunal habitats were assessed by BCE, identifying suitable vegetation of dense tall chenopod shrubland. As a result, there may be 2370 ha of habitat for the species in the study area, of which 137 ha (5.7%) lies within the project footprint (Figure 8).

760000 770000 780000 790000 210000 220000 230000 240000 250000

7010000 7000000 6990000 6980000 6970000 6960000

MGA ZONE 50
MGA ZONE 51

SANDSTONE WILUNA ROAD

Inset

Barr Smith Range

ALTONA YEELIRRIE ROAD

GOLDFIELDS HIGHWAY

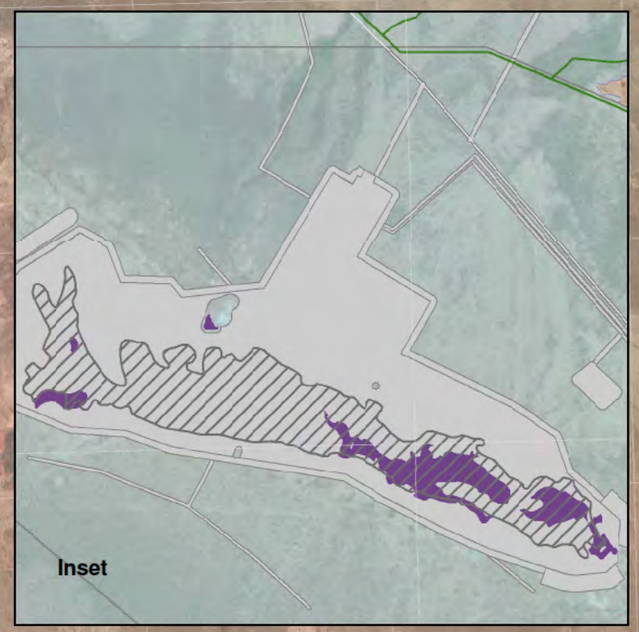
WILUNA LEINSTER ROAD

Source: Landsat, 2005

N

0 2 4 6 8 10
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51




**Legend**

- Pit Outline
- Project Area
- Indicative Project Footprint
- Study Area
- Slender-billed Thornbill Habitat (derived from Western Botanical 2010)

| | | | |
|---|---|---|---|
| **BHP Billiton Yeelirrie Development Company Pty Ltd** | Project: **Proposed Yeelirrie Development** | | Title: Slender-billed Thornbill Habitat |
| BAMFORD CONSULTING ECOLOGISTS | Drawn: DL/CJT | Approved: KD | Date: 21/01/2011 |
| | Job No.: 42907132 | File No.: 42907132-SUS-246_RB.mxd | Figure: 8 |
| | | | Rev. B<br>A3 |

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Brush-tailed Mulgara

The Brush-tailed Mulgara was trapped at Sites 6 and 10, and evidence of the species (burrows, foraging holes, scats and tracks) was recorded extensively across the study area (Figure 9, Appendix 7 and Plates 24 and 25). Locations of transects and evidence of the Brush-tailed Mulgara are presented on Figure 9. It was most abundant in the habitat of Scattered Shrubs on Spinifex Sandplain (closely aligned with Bullimore Sandplain Landsystem), was less abundant in the two Mulga habitats and was absent from Acacia woodland on sparse spinifex, Calcrete, Calcrete Outwash and along the granite breakaways (Granite Outcrop and Breakaways habitat) (Plates 25 and 26). The May 2010 survey included a large part of the study area at locations proposed for infrastructure. The species was either uncommon or absent apart from in some of the area proposed for the processing plant, and tailing facilities, which had been recently burnt (within previous five years). Suitable habitat for the Brush-tailed Mulgara comprises approximately 69.9 % (69,840 ha) of the total Project area. Photographs of burrows and habitat are presented below.

A total of 154 burrow systems was recorded in 842 ha of search area. Some burrow systems had multiple entrances and may contain multiple burrows or animals, while there is the chance that several burrows are maintained by one individual. The burrow density of the areas searched are thus a minimum of 0.18 burrows/ha within the search areas. Burrow systems with obvious foraging and track signs were identified as active (Plate 24), although inactive burrows may also be utilised; a total of 86 active burrow systems was recorded or there was an active burrow density of approximately 0.1 burrows/ha. Given there is approximately 69,840 ha of suitable habitat within the Project area, there may be approximately 6,984 active burrow systems within this area. Brush-tailed Mulgara are generally considered to be solitary, with males and females found in the same burrow only during the mating season (van Dyck and Strahan 2008). Therefore, the Project area may support several thousand Brush-tailed Mulgara.

Because of the recent taxonomic revision of the two mulgara species, close attention was paid to identification of all Mulgara handled. Diagnostic features of the dentition and number of teats are presented in Plates 27 and 28 below.

**Plate 24. Active Mulgara burrow system (Site 10).**


**Plate 25. Mulgara habitat – Scattered shrubs over Spinifex over sandplain.**

Note the burrow systems in the foreground (Site 10).

**Plate 26. Mulgara habitat – Mulga over Spinifex sandplain (Site 5).**

**Plate 26. Brush-tailed Mulgara upper pre-molars (Site 10), November 2009.**

Note the species has two upper pre-molars whereas the Crest-tailed Mulgara has three.

**Plate 27. Brush-tailed Mulgara pouch showing four of the six teats (Site 10), November 2009.**

This is a lactating female with young left in the burrow. The Crest-tailed Mulgara has eight teats.

760000 770000 780000 790000 210000 220000 230000 240000 250000

7010000 7000000 6990000 6980000 6970000 6960000

MGA ZONE 50
MGA ZONE 51

SANDSTONE WILUNA ROAD

Barr Smith Range

N

0 2 4 6 8 10
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51

Systematic Trapping Location Site 10

Inset 1

Systematic Trapping Location Site 6

Inset 2

Inset 3

Inset 4

Inset 5

Inset 6

Source:
Landsat, 2005 (Main Map)
SPOT, 2009 (Insets)

**Legend**

- Study Area
- Pit Outline

**Mulgara Survey Locations**

- Burrow Active
- Burrow Inactive
- Foraging Holes, Scats and Tracks
- Trapped
- Bamford Consulting Ecologists Targeted Significant Fauna Transects
- Suitable Mulgara Habitat

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Evidence of the Brush-tailed Mulgara

| Drawn: DL | Approved: KD | Date: 20/01/2011 | Figure: 9 | Rev. D |
|---|---|---|---|---|
| Job No.: 42907132 | File No.: 42907132-SUS-206_RD.mxd | | | A3 |

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Black-flanked Rock-Wallaby

Anecdotal reports of Black-flanked Rock-Wallabies in the Barr Smith Range provided cause for targeted searches of the animals or their distinctive scats (Creese 2007, see Plate 29), and motion-sensitive cameras were set. No Rock-Wallabies were seen or photographed, but scats were recorded from a small perched cave along the Barr Smith Range at 51J, 247522E, 6984286N and at 51J, 249549E, 6979633N; and 51J, 248175E, 6979824N, approximately 40 km east of the resource (Figure 10). A sample of scats was collected and later verified (by Scats About and Sonia Creese, see Appendix 10) as Rock-Wallaby scats. The only Rock-Wallaby species known from the region is the Black-flanked Rock-Wallaby. Many scats appeared old, however some scats had a dark coating, appeared fairly fresh and were estimated to be less than five years old (S. Creese pers. comm.).

There is extensive suitable habitat for the Black-flanked Rock-Wallaby along the Barr-Smith Range and breakaway area south of the Project area (see Plate 30), with a small portion of breakaway habitat nearby the proposed quarry.


**Plate 28. Some examples of the Rock-Wallaby scats collected from a small perched cave along the Barr Smith Range at 51J, 247522E, 6984286N.**

**Plate 29. Breakaway at Barr Smith Range, providing suitable habitat for the Black-flanked Rock-Wallaby. Old scats of the species were present at this location.**

Inland Greater Long-eared Bat

One record of the Inland Greater Long-eared Bat was made with an Anabat recorder, at Rubble Bore (50J, 782841E, 6997710N) within the study area, approximately 6 km northwest of the resource (Appendix 8 and Figure 10). This species roosts singly or in small groups primarily in tree hollows (Churchill 1998) and is likely to utilise the *E. gypsophila* woodland in the Calcrete habitat within and northwest of the resource, as this represents the greatest concentration of large, hollow-bearing trees in the Project area.

760000 770000 780000 790000 210000 220000 230000 240000 250000

7010000 7000000 6990000 6980000 6970000 6960000

MGA ZONE 50
MGA ZONE 51

SANDSTONE WILUNA ROAD

Anabat recording of Inland Greater Long-eared Bat

Barr Smith Range

Black-flanked Rock-Wallaby scats recorded in cave

ALTONA YEELIRRIE ROAD

GOLDFIELDS HIGHWAY

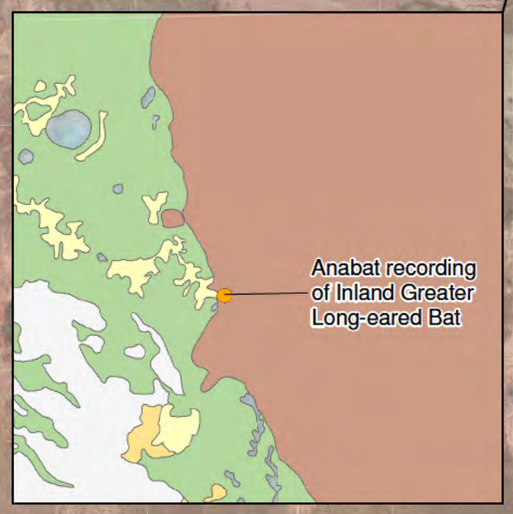
WILUNA LEINSTER ROAD

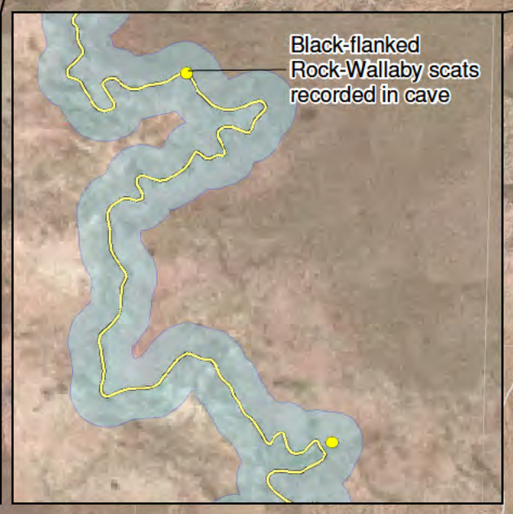
Source: Landsat, 2005

N

0 2 4 6 8 10
Kilometres

Datum: GDA94
Projection: MGA
Grid: MGA Zone 50 and 51




**Legend**

- Pit Outline
- Anabat Location
- Harp Trap Location

**Fauna Habitat derived from Western Botanical (Bamford, 2011)**

- Calcrete
- Calcrete Outwash
- Chenopod shrubland over sandplain
- Granite Outcrops and Breakaways
- Hardpan Mulga
- Mixed Shrubs over Spinifex sandplains
- Rock Wallaby Survey Location
- Rock-Wallaby Survey Transect
- Study Area

**BHP Billiton Yeelirrie Development Company Pty Ltd**

BAMFORD CONSULTING ECOLOGISTS

Project: **Proposed Yeelirrie Development**

Title: Evidence of the Black-flanked Rock-Wallaby and the Inland Greater Long-eared Bat

| Drawn: DL / CJT | Approved: KD | Date: 17/01/2011 |
|---|---|---|
| Job No.: 42907132 | File No.: 42907132-SUS-208_RD.mxd | |

Figure: 10 | Rev. D | A3

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**Table 11. Conservation status of significant fauna species expected to occur in the Project area.**

+indicates species that were recorded by Anonymous (1978). ^Local records include: Project area (PA), Wanjarri Nature Reserve (WAN), Mount Keith Mine (MK). Conservation significance categories are defined in Appendix 2.

| Species | | Reason For Significance | | | | Comments | | |
|---|---|---|---|---|---|---|---|---|
| | | EPBC Act | WA Wildlife Conservation Act | DEC Priority | Other | Recorded in study area | Status in study area | Local records^ |
| **CONSERVATION SIGNIFICANCE 1 (CS1)** | | | | | | | | |
| *Leipoa ocellata* | Malleefowl | Vulnerable | Schedule 1 (Vulnerable) | | | **Recorded** | Resident | PA |
| *Falco peregrinus* | Peregrine Falcon | | Schedule 4 | | | **Recorded** | Resident | PA |
| *Apus pacificus* | Fork-tailed Swift | Migratory | | | JAMBA, CAMBA | **Recorded+** | Irregular Visitor | Yeelirrie |
| *Merops ornatus* | Rainbow Bee-eater | Migratory | | | | **Recorded** | Regular Visitor | PA |
| *Lophocroa leadbeateri* | Major Mitchell's Cockatoo | | Schedule 4 | | | **Recorded+** | Irregular Visitor | Yeelirrie |
| *Polytelis alexandrae* | Princess Parrot | Vulnerable | | P 4 | | | Irregular Visitor | WAN |
| *Acanthiza iredalei* | Slender-billed Thornbill | Vulnerable | | | | | Irregular Visitor | Meekatharra |
| *Petrogale lateralis* | Black-flanked Rock-Wallaby | | Schedule 1 (Threatened) | | | **Recorded** | Resident | study area |
| *Dasycercus cristicauda* | Crest-tailed Mulgara | Vulnerable | Schedule 1 (Vulnerable) | | | | Unknown | Unknown |

| Species | | Reason For Significance | | | | Comments | | |
|---|---|---|---|---|---|---|---|---|
| | | EPBC Act | WA Wildlife Conservation Act | DEC Priority | Other | Recorded in study area | Status in study area | Local records^ |
| *Macrotis lagotis* | Greater Bilby | Vulnerable | Schedule 1 (Vulnerable) | | | | Locally Extinct | Wiluna |
| *Egernia kintorei* | Great Desert Skink | Vulnerable | Schedule 1 (Threatened) | | | | Unknown | WAN |
| *Limosa limosa* | Black-tailed Godwit | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | None |
| *Tringa nebularia* | Common Greenshank | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Cue |
| *Tringa stagnatalis* | Marsh Sandpiper | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Cue |
| *Tringa hypoleucos* | Common Sandpiper | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Meekatharra |
| *Tringa glareola* | Wood Sandpiper | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Cue |
| *Calidris ruficollis* | Red-necked Stint | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Cue |
| *Calidris acuminata* | Sharp-tailed Sandpiper | Migratory | Schedule 3 | | JAMBA, CAMBA | **Recorded+** | Irregular Visitor | Yeelirrie |
| *Calidris ferruginea* | Curlew Sandpiper | Migratory | Schedule 3 | | JAMBA, CAMBA | | Irregular Visitor | Lake Austin |
| *Ardea modesta* | Eastern Great Egret | Migratory | Schedule 3 | | JAMBA, CAMBA | **Recorded+** | Irregular Visitor | Yeelirrie |

| Species | | Reason For Significance | | | | Comments | | |
|---|---|---|---|---|---|---|---|---|
| | | EPBC Act | WA Wildlife Conservation Act | DEC Priority | Other | Recorded in study area | Status in study area | Local records^ |
| **CONSERVATION SIGNIFICANCE 2 (CS2)** | | | | | | | | |
| *Dasycercus blythi* | Brush-tailed Mulgara | | | P 4 | | **Recorded** | Resident | PA |
| *Falco hypoleucos* | Grey Falcon | | | P 4 | | | Irregular Visitor | WAN |
| *Ardeotis australis* | Australian Bustard | | | P 4 | | **Recorded** | Resident | PA |
| *Burhinus grallarius* | Bush Stone-curlew | | | P 4 | | **Recorded** | Resident | PA |
| *Amytornis striatus* | Striated Grasswren | | | P 4 | | | Irregular visitor | WAN |
| *Sminthopsis longicaudata* | Long-tailed Dunnart | | | P 3 | | | Resident | Wiluna |
| *Nyctophilus timoriensis* | Inland Greater Long-earedBat | | | P 4 | | **Recorded** | Resident | PA |
| **CONSERVATION SIGNIFICANCE 3 (CS3)** | | | | | | | | |
| *Aprasia picturata* | legless lizard | | | | Restricted range, few records | | Unknown | Wiluna |
| *Lophoictinia isura* | Square-tailed Kite | | | | Generally uncommon to rare | **Recorded** | Regular Visitor | Yeelirrie |
| *Polytelis anthopeplus* | Regent Parrot | | | | Edge of range | | Vagrant | WAN |
| *Neophema splendida* | Scarlet-chested Parrot | | | | Western edge of range | | Irregular Visitor | WAN |

| Species | | Reason For Significance | | | | Comments | | |
|---|---|---|---|---|---|---|---|---|
| | | EPBC Act | WA Wildlife Conservation Act | DEC Priority | Other | Recorded in study area | Status in study area | Local records^ |
| *Stipiturus ruficeps* | Rufous-crowned Emu-wren | | | | Uncommon and patchily distributed | | Resident | WAN |
| *Conopophila whitei* | Grey Honeyeater | | | | Generally uncommon to rare | | Resident | WAN |
| *Antichinomys laniger* | Kultarr | | | | Generally uncommon to rare | | Resident | MK |
| *Pseudomys desertor* | Desert Mouse | | | | Edge of range | | Resident | MK |

**Table 12. Preferred habitat of conservation significant fauna species expected to occur in the Project area on the basis of fauna habitat, soil landscape and vegetation.**

| Species | Extent of preferred habitat in the Project area | BCE Fauna Habitat | Soil Landscapes (Blandford & Associates) | Vegetation Code (Western Botanical) |
|---|---|---|---|---|
| **CONSERVATION SIGNIFICANCE 1 (CS1)** | | | | |
| *Leipoa ocellata* Malleefowl | Some; dense Acacia shrublands on sandplains Most habitat is thought to be associated outside the Project area, confined to Acacia Shrublands on Sanplain in higher landscapes | Acacia Woodland over Sparse Spinifex | Sand plain system | SAMU, HPMS, SAWS, SAMA |
| *Polytelis alexandrae* Princess Parrot | Some; *E. gypsophila* woodland patches | Calcrete | Calcrete system | CEgW, CMGbS |
| *Lophocroa leadbeateri* Major Mitchell's Cockatoo | Some; *E. gypsophila* woodland patches | Calcrete | Calcrete system | CEgW, CMGbS |
| *Merops ornatus* Rainbow Bee-eater | Extensive; woodlands on sandplains throughout the Project area | Spinifex Sandplain, Calcrete, Hardpan Mulga | Calcrete, playa and sand plain systems | Numerous including: CEgW, SAMU, SAMA |
| *Apus pacificus* Fork-tailed Swift | Not applicable; Aerial species | Not applicable | Not applicable | Not applicable |
| *Falco peregrinus* Peregrine Falcon | Minimal; potential breeding sites along Barr Smith Range and in *E. gypsophila* woodland on Deposit. | Granite Outcrops and Breakaways, Calcrete and Spinifex sandplain | Granite system, calcrete system and sand plain system | CEgW, GR, DRES, DRMS |

| Species | Extent of preferred habitat in the Project area | BCE Fauna Habitat | Soil Landscapes (Blandford & Associates) | Vegetation Code (Western Botanical) |
|---|---|---|---|---|
| **Migratory Bird species**:<br>*Limosa limosa* Black-tailed Godwit<br>*Tringa nebularia* Common Greenshank<br>*Tringa stagnatalis* Marsh Sandpiper<br>*Tringa hypoleucos* Common Sandpiper<br>*Tringa glareola* Wood Sandpiper<br>*Calidris ruficollis* Red-necked Stint<br>*Calidris ferruginea* Curlew Sandpiper<br>*Calidris acuminata* Sharp-tailed Sandpiper<br>*Ardea modesta* Eastern Great Egret | Negligible; seasonal waterbodies in some areas. | Not applicable | Playa system | Seasonal wetlands including those associated with PLMf, PLAET, PLCh, PLELG |
| *Acanthiza iredalei*<br>Slender-billed Thornbill | Some; small areas of chenopod shrublands in the Project area | Subsets of the Calcrete Outwash and Chenopod Shrubland on Sandplain | Playa system, calcrete system | PLCsMp, CMpS, CApS |
| *Petrogale lateralis*<br>Black-flanked Rock-Wallaby | Negligible; rocky outcrops with caves and rock piles associated with the Barr Smith Range. May forage and move into the Project area during dispersal. | Granite Outcrops and Breakaways | Granite system | Qtz |
| *Dasycercus cristicauda*<br>Crest-tailed Mulgara | Unknown due to recent taxonomic revision. Probably sand dunes and grasslands near salt lakes. | Unknown | Unknown | Unknown |
| *Macrotis lagotis*<br>Greater Bilby | Extensive; Spinifex sandplains adjacent to Deposit. | Spinifex Sandplains | Sand plain system | May occur across numerous including SDSH, SASP, SAWS, SAMA, SAHS |
| *Liopholis kintorei*<br>Great Desert Skink | Minimal; species prefers sandy soils whereas even sandplains in the Project area are a sandy-loam. | Spinifex Sandplains | Sand plain system | SDSH, SASP, SAMA, SAMU, SAWS |

| Species | Extent of preferred habitat in the Project area | BCE Fauna Habitat | Soil Landscapes (Blandford & Associates) | Vegetation Code (Western Botanical) |
|---|---|---|---|---|
| **CONSERVATION SIGNIFICANCE 2 (CS2)** | | | | |
| *Dasycercus blythi*<br>Brush-tailed Mulgara | Extensive; Spinifex sandplains adjacent to Deposit, areas of Mulga shrubland and open woodland to the south of Deposit. | Spinifex Sandplains | Sand plain system | SASP, SAWS, SAMA, SAHS, SAGS, SAMU, WABS, SDSH |
| *Burhinus grallarius*<br>Bush Stone-curlew | Extensive; *E. gypsophila* woodland, dense Acacia shrublands, gnamma holes and *Casuarina* woodland. | All | All | Numerous including CEgW, CCpW, CAbS, CMxS, SAMU, SAWS, DRMS, GRMU |
| *Ardeotis australis*<br>Australian Bustard | Some; sandplains adjacent to Deposit. | Spinifex Sandplains | Sand plain system | Numerous including SASP, SDSH, SAMA, SAHS |
| *Falco hypoleucos*<br>Grey Falcon | Some; dense shrublands within the Project area | Spinifex Sandplains | Sand plain system | SAMU, SASP, SDSH |
| *Amytornis striatus*<br>Striated Grasswren | Some; mature Spinifex Sandplains within the Project area | Spinifex sandplains | Sand plain system | SASP |
| *Nyctophilus major tor*<br>Inland Greater Long-eared Bat | Negligible; rocky ridges and stony slopes with Spinifex associated with the Barr Smith Range. May forage and move into the Project area during dispersal. | Granite Outcrops and Breakaways | Granite system | GR, GRMS, GPOS, BCLS |
| *Sminthopsis longicaudata*<br>Long-tailed Dunnart | Rocky ridges, stony slopes with Spinifex | Granite Outcrops and Breakaways | Granite system | GR, GRMS, GPOS, BCLS |
| **CONSERVATION SIGNIFICANCE 3 (CS3)** | | | | |
| *Aprasia picturata* | Negligible; rocky areas associated with the Barr Smith Range. | Granite Outcrops and Breakaways | Granite system | GR, GRMS, GPOS, BCLS |
| *Lophoictinia isura*<br>Square-tailed Kite | Some; *E. gypsophila* woodland patches within the Project area, extensive areas of Mulga shrubland. | Calcrete, Spinifex Sandplains | Calcrete system, Granite system | Numerous including SAMU, DRES, DRMS, GRMU, CEgW. |

| Species | Extent of preferred habitat in the Project area | BCE Fauna Habitat | Soil Landscapes (Blandford & Associates) | Vegetation Code (Western Botanical) |
|---|---|---|---|---|
| *Polytelis anthopeplus*<br>Regent Parrot | Some, but usage probably infrequent. | Calcrete | Calcrete system | CEgW. |
| *Neophema splendida*<br>Scarlet-chested Parrot | Some; *E. gypsophila* woodland patches and extensive areas of Mulga shrubland within the Project area. Potential breeding in *Eucalyptus gypsophila* woodland | Calcrete, Spinifex Sandplains | Calcrete system, Sand plain system | Numerous including CEgW, SAMU, SAWS, DRMS, DRES |
| *Stipiturus ruficeps*<br>Rufous-crowned Emu-wren | Extensive; Spinifex Sandplains adjacent to Deposit. | Spinifex Sandplains | Sand plain system | SASP |
| *Conopophila whitei*<br>Grey Honeyeater | Extensive; areas of Mulga shrubland within the Project area. | Spinifex Sandplains | Sandplain system, Granite system | SAMU, SAWS, DRMS, GRMU |
| *Antichinomys laniger*<br>Kultarr | Minimal; Stony plains occurs mostly outside the Project area along the proposed Haul Road. | Granite Outcrops and Breakaways | Granite system | SAES |
| *Pseudomys desertor*<br>Desert Mouse | Extensive; Spinifex Sandplains adjacent to Deposit, small areas of chenopod shrublands in the Project area. | Spinifex Sandplains, Calcrete Outwash | Sand plain system | SASP, SAWS, SAMA, SAHS, SAGS, SAMU, WABS, SDSH |

**Table 13. Number of reptile captures at each sampling site, combined for March and November 2009. Sites are grouped by Fauna Habitat type as described in Section 3.2.**

No sampling undertaken in the Chenopod Shrubland on Sandplain and Granite Outcrops and Breakways habitat as these were considered outside the area of impact.

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia Woodland over sparse Spinifex | | Total Number of Individuals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site code:** | 1 | 13 | 8 | 11 | 2 | 3 | 12 | 4 | 6 | 5 | 7 | 9 | 10 | 14 | 15 | |
| **Number of trapnights** | 140 | 150 | 120 | 125 | 140 | 140 | 150 | 200 | 200 | 200 | 200 | 225 | 350 | 155 | 150 | |
| *Diplodactylus conspicillatus* | | | 1 | | | | | | 1 | 2 | | | | | | 4 |
| *Diplodactylus granariensis* | | | 2 | | | | | | | | | 1 | | | 1 | 4 |
| *Diplodactylus pulcher* | | | | | | | 1 | | | | | | | | | 1 |
| *Gehyra varigata* | 14 | 1 | 2 | | 1 | | 2 | | | | 1 | | 1 | 1 | | 23 |
| *Heteronotia binoei* | 1 | | | 2 | | 3 | | | | | 1 | | | | | 7 |
| *Nephrurus vertebralis* | | | 2 | | | 2 | 2 | 1 | 3 | | 1 | | | | | 11 |
| *Rhynchoedura ornata* | 3 | | 2 | | | | | | | | | 2 | | | 1 | 8 |
| *Strophurus elderi* | | | | | | | | | | | | 6 | | | | 6 |
| *Strophurus strophurus* | | | 1 | | | | 1 | | | | | | | | | 2 |
| *Strophurus wellingtonae* | | | 1 | | | | | | | | | | | | | 1 |
| *Delma nasuta* | | | | | | | | | | | | 1 | | | | 1 |
| *Lialis burtonis* | | | | | | | | | | | | 1 | | | | 1 |

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia Woodland over sparse Spinifex | | Total Number of Individuals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site code:** | 1 | 13 | 8 | 11 | 2 | 3 | 12 | 4 | 6 | 5 | 7 | 9 | 10 | 14 | 15 | |
| **Number of trapnights** | 140 | 150 | 120 | 125 | 140 | 140 | 150 | 200 | 200 | 200 | 200 | 225 | 350 | 155 | 150 | |
| *Pygopus nigriceps* | | | | | | | | | | 1 | | | | | | 1 |
| *Ctenophorus isolepis* | | | | | | | | | | 1 | | 6 | 11 | | | 18 |
| *Ctenophorus nuchalis* | | | | | 1 | | | | | | | | | | | 1 |
| *Pogona minor* | | | | | | | | | | | | 1 | | | | 1 |
| *Varanus caudolineatus* | | | | | | | | 2 | | 1 | 1 | | | | | 4 |
| *Varanus eremius* | | | | | | | | | | | | | | | | 1 |
| *Varanus gouldii* | | | | | | | | | | | 1 | 2 | 2 | | | 5 |
| *Varanus panoptes* | | | | | 1 | | 1 | | | | | | | 1 | | 3 |
| *Cryptoblepharus buchananii* | | 1 | 1 | | | 1 | | | | | | | | | | 3 |
| *Cryptoblepharus plagiocephalus* | | | | 1 | | | | | | | | | | | | 1 |
| *Ctenotus ariadnae* | | | | | | | | | | | | 2 | 1 | | | 3 |
| *Ctenotus grandis* | | | | | | | | | | | | 1 | 6 | | | 7 |
| *Ctenotus hanloni* | | | | | | | | | | | | 1 | | | | 1 |
| *Ctenotus helenae* | | | | | | | | | | | | 15 | 16 | | | 31 |

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia Woodland over sparse Spinifex | | Total Number of Individuals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site code:** | 1 | 13 | 8 | 11 | 2 | 3 | 12 | 4 | 6 | 5 | 7 | 9 | 10 | 14 | 15 | |
| **Number of trapnights** | 140 | 150 | 120 | 125 | 140 | 140 | 150 | 200 | 200 | 200 | 200 | 225 | 350 | 155 | 150 | |
| *Ctenotus leonhardii* | | | | | | | | | 15 | 6 | | 1 | | 1 | 4 | 27 |
| *Ctenotus pantherinus* | | | | | | | | | | | | 2 | 1 | | | 3 |
| *Ctenotus schomburgkii* | | | 3 | | | | | 2 | 1 | 3 | 9 | | | | | 18 |
| *Egernia depressa* | | | | | | | | | 1 | | 1 | | | | | 2 |
| *Eremiascincus richardsoni* | | 1 | 5 | | | 2 | | | | | | | | | | 8 |
| *Lerista desertorum* | 1 | | 1 | | 1 | | | | | 1 | | | | | | 4 |
| *Lerista rhodonoides* | 1 | | | | | 1 | 1 | | 1 | | | 2 | 2 | | | 8 |
| *Mentia greyii* | 1 | | | | 2 | | | 6 | 1 | 3 | 2 | | 4 | | | 19 |
| *Morethia butleri* | | 1 | 3 | | 1 | | | | | | 2 | | | | | 7 |
| *Tiliqua occipitalis* | | | | | | | | | | | | | 1 | | | 1 |
| *Tiliqua multifasciata* | | | | | | | | | | | | 1 | 1 | | | 2 |
| *Ramphotyphlops hamatus* | 1 | | | | | | | | | | | | | | | 1 |
| *Ramphotyphlops bicolor* | | | | | | | | 1 | | | | | | | | 1 |
| *Pseudonaja modesta* | | | | | | | | | 1 | | | | | | 1 | 2 |
| *Pseudonaja nuchalis* | | | | | | 1 | | | | | | | | | | 1 |

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia Woodland over sparse Spinifex | | Total Number of Individuals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site code:** | 1 | 13 | 8 | 11 | 2 | 3 | 12 | 4 | 6 | 5 | 7 | 9 | 10 | 14 | 15 | |
| **Number of trapnights** | 140 | 150 | 120 | 125 | 140 | 140 | 150 | 200 | 200 | 200 | 200 | 225 | 350 | 155 | 150 | |
| *Simoselaps bertholdii* | 1 | | | | 1 | | 1 | | | | | | | | | 3 |
| *Dasycercus blythi* | | | | | | | | | 1 | | | | 13 | | | 14 |
| *Sminthopsis hirtipes* | | 1 | | | | | | | 1 | 1 | | 4 | | | | 7 |
| *Sminthopsis macroura* | | | | 1 | 5 | | | | | | | | | | | 6 |
| *Sminthopsis ooldea* | | 1 | | | | | | | | | | | | | | 1 |
| *Ningaui ridei* | | | | | | | | | 1 | 2 | | 10 | 6 | | | 19 |
| N CAPTURES reptiles | 23 | 4 | 23 | 3 | 8 | 9 | 9 | 12 | 24 | 18 | 19 | 45 | 46 | 3 | 7 | 355 |
| N CAPTURES mammals | 0 | 2 | 0 | 1 | 5 | 0 | 0 | 0 | 3 | 3 | 0 | 14 | 19 | 3 | 0 | 50 |
| N species | 8 | 6 | 12 | 2 | 8 | 6 | 7 | 5 | 9 | 10 | 9 | 18 | 13 | 3 | 4 | |
| Reptile captures/100 trapnights | 16.0 | 1.3 | 16.4 | 1.6 | 5.7 | 6.4 | 6.0 | 6 | 12 | 9 | 9.5 | 20 | 13.1 | 1.9 | 4.6 | |
| Mammal captures/100 trapnights | 0 | 1.3 | 0 | 0.8 | 3.5 | 0 | 0 | 0 | 1.5 | 1.5 | 0 | 6.2 | 5.4 | 1.9 | 0 | |

**Table 14. Number of records of birds during censussing at each sampling site, combined for March and November 2009.**

Fauna habitats as described in Section 3.2. See Appendix 3 for species names. No sampling undertaken in the Chenopod Shrubland on Sandplain and Granite Outcrops and Breakways habitat as these were considered outside the area of impact.

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia woodland over sparse Spinifex | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site | 1 | 13 | 8 | 11 | 2 | 3 | 12 | 4 | 6 | 5 | 7 | 9 | 10 | 14 | 15 |
| Species\N sampling days | 7 | 5 | 7 | 5 | 7 | 7 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 5 |
| Emu | | | | | 1 | | | | 1 | | 1 | | 1 | | |
| Crested Pigeon | | | | | | | | | | | 1 | | 1 | | |
| Wedge-tailed Eagle | | | | 1 | | | | | 2 | | | | | | |
| Brown Falcon | | | | | | | | | 1 | | | | | | |
| Nankeen Kestrel | 1 | | | | | | | | | | | | | | |
| Bush Stone-curlew | | | 1 | | | | | | | | | | | | |
| Galah | 1 | | | | | | | | | | | | | | |
| Australian Ringneck | 2 | 3 | | | | | | 1 | | | | | | | |
| Mulga Parrot | | | | | | 2 | | | | | | | | | |
| Horsfield's Bronze-Cuckoo | | | | 1 | | | | | | | | | | | |
| White-winged Fairy-wren | | | | | 13 | 2 | 4 | | | | | 4 | | | |
| Inland Thornbill | 2 | | | 3 | | 2 | | | | | | | | 2 | |
| Slatey-backed Thornbill | | | | | | | | 3 | 5 | 3 | | | | | |

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia woodland over sparse Spinifex | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site** | **1** | **13** | **8** | **11** | **2** | **3** | **12** | **4** | **6** | **5** | **7** | **9** | **10** | **14** | **15** |
| **Species\N sampling days** | **7** | **5** | **7** | **5** | **7** | **7** | **5** | **10** | **10** | **10** | **10** | **10** | **10** | **5** | **5** |
| Chestnut-rumped Thornbill | | | | | | | 1 | 4 | 5 | 11 | 3 | | 2 | | 1 |
| Yellow-rumped Thornbill | | | | | | 4 | | 1 | 8 | 3 | | | | | |
| Striated Pardalote | 6 | 1 | | | | | | | | | 1 | | | | |
| Weebill | 8 | 1 | | 2 | | | | | | | | | | | |
| Yellow-throated Miner | 9 | 6 | 4 | 1 | 2 | 3 | | | 2 | | 3 | | | | |
| Spiny-cheeked Honeyeater | | | | | | | | 1 | | | | | | | |
| Singing Honeyeater | | 1 | | 2 | | 1 | 1 | 3 | | | 1 | 2 | | | 1 |
| Grey-crowned Babbler | 2 | 1 | | | | 3 | 2 | | | | 2 | | | | |
| Black-faced Cuckoo-shrike | 2 | 1 | | | | | | | | | | | 1 | | |
| Rufous Whistler | | | | | | | | 1 | 2 | 3 | 1 | | 1 | | |
| Grey Shrike-thrush | | | | | | | 1 | | | | 1 | | | | 1 |
| Crested Bellbird | | | 2 | | | | | | 1 | 1 | 4 | 1 | 3 | 2 | 1 |

| Fauna Habitat | Calcrete | | | | Calcrete outwash | | | Hardpan Mulga | | Mulga over Spinifex sandplain | | Scattered shrubs over Spinifex sandplain | | Acacia woodland over sparse Spinifex | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site** | **1** | **13** | **8** | **11** | **2** | **3** | **12** | **4** | **6** | **5** | **7** | **9** | **10** | **14** | **15** |
| **Species\N sampling days** | **7** | **5** | **7** | **5** | **7** | **7** | **5** | **10** | **10** | **10** | **10** | **10** | **10** | **5** | **5** |
| Black-faced Woodswallow | | | | 2 | | 4 | | 2 | | | 2 | 1 | 6 | | |
| Masked Woodswallow | | | 2 | | | | | | | 4 | | | | | |
| Grey Butcherbird | 1 | | 1 | | | | | 1 | | | 1 | | | | 1 |
| Pied Butcherbird | 6 | 1 | | | | 1 | | | | | | | 2 | | 1 |
| Australian Magpie | 1 | | | | | | | | | | | | | | 1 |
| Willie Wagtail | 1 | | | | | | 2 | | 1 | 1 | 1 | | 2 | | |
| Little Crow | 1 | | | | | | | | | | | | | | |
| Torresian Crow | | | | | | | | 1 | | | | | | | |
| Red-capped Robin | | | 2 | | | | | 8 | 5 | 1 | 3 | | | | |
| Mistletoebird | 1 | | | | | | | 1 | | | | | | | |
| N records | 44 | 15 | 12 | 11 | 15 | 22 | 11 | 27 | 29 | 27 | 23 | 8 | 17 | 4 | 7 |
| Species Ricness | 15 | 8 | 6 | 7 | 3 | 9 | 6 | 12 | 11 | 8 | 14 | 4 | 9 | 2 | 7 |
| N records/day | 6.3 | 5.0 | 1.7 | 2.2 | 2.1 | 3.1 | 2.2 | 2.7 | 2.9 | 2.7 | 2.3 | 0.8 | 1.7 | 0.8 | 1.4 |

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## APPENDICES

### Appendix 1. Soil landscapes (provided by D. C. Blandford and Assoc. 2009) and vegetation communities (provided by Western Botanical 2010).

| Soil Landscape | Code | Vegetation Community Name |
|---|---|---|
| **Granite system** | SAES | Stony Acacia Eremophila Shrubland |
| | BCLS | Breakaway Chenopod Low Shrubland |
| | GFGr | Granite Foot Slope Grassland |
| | GPoS | *Ptilotus obovatus* Shrubland |
| | Qtz | Quartz Ridge |
| | GR | Granite Rise |
| | GRMS | Mulga Shrubland on Granite Rise |
| **Sand plain system** | SASP | Sand plain Spinifex Hummock Grassland |
| | SAWS | Sand plain Spinifex Hummock Grassland with Wattles |
| | SAMA | Sand plain Spinifex Hummock Grassland with Mallee |
| | SAHS | Sand plain Spinifex Hummock Grassland with Heath |
| | SAGS | Sand plain Spinifex Hummock Grassland with *Eucalyptus gongylocarpa* |
| | SDSH | Sand Dune Shrubland |
| | SAMU | Sandplain Mulga Spinifex Hummock Grassland |
| **Playa System** | PLAPoS | *Acacia Ptilotus obovatus* Shrubland |
| | PLAET | *Acacia Eremophila* Thicket |
| | PLAMi | *Acacia Melaleuca interioris* Shrubland |
| | PLMf | *Muehlenbeckia florulenta* Shrubland |
| | PLCsMp | *Cratystylis subspinescens* and *Maireana pyramidata* Shrubland |
| | PLEmc | *Eremophila maculata* ssp. *brevifolia* Shrubland |
| | PLEml | *Eremophila malacoides* Shrubland |
| | PLEsp | *Eragrostis* sp. Grassland on Playa |
| | PLCh | Chenopods on Scalded Areas |

| | | |
|---|---|---|
| **Hardpan and Drainage System** | WABS | Wanderrie Bank Grassy Shrubland |
| | HPMS | Hardpan Plain Mulga Shrubland |
| | DRMS | Drainage Tract Mulga Shrubland |
| | DRES | Drainage Line *Eucalyptus* Woodland |
| | GRMU | Mulga Groves on Hardpan Plains |
| **Calcrete system** | CEgW | *Eucalyptus gypsophila* Woodland on Calcrete |
| | CCpW | *Casuarina pauper* Woodland on Calcrete |
| | CMxS | *Melaleuca xerophila* Shrubland on Calcrete |
| | CAbS | *Acacia burkittii* Shrubland on Calcrete |
| | CMiS | *Melaleuca interioris* Shrubland on Calcrete |
| | CErG | *Eragrostis* sp. Grassland on Calcrete |
| | CApS | *Atriplex* sp. Yeelirrie Station Shrubland on Calcrete |
| | CRdS | *Rhagodia* sp. Shrubland on Calcrete |
| | CMpS | *Maireana pyramidata* Shrubland on Calcrete |
| | CLaS | *Lycium australe* Shrubland on Calcrete |
| | CMGbS | Mulga *Grevillea berryana* Shrubland on Calcrete |

## Appendix 2. Assesment of conservation status

### Table A. Categories used in the assessment of conservation status

IUCN categories (based on review by Mace and Stuart 1994) as used for the Environmental Protection and Biodiversity Conservation Act and the Western Australian Wildlife Conservation Act.

**Extinct.** Taxa not definitely located in the wild during the past 50 years.

**Extinct in the Wild.** Taxa known to survive only in captivity.

**Critically Endangered.** Taxa facing an extremely high risk of extinction in the wild in the immediate future.

**Endangered.** Taxa facing a very high risk of extinction in the wild in the near future.

**Vulnerable.** Taxa facing a high risk of extinction in the wild in the medium-term future.

**Near Threatened.** Taxa that risk becoming Vulnerable in the wild.

**Conservation Dependent.** Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classed as Vulnerable or more severely threatened.

**Data Deficient (Insufficiently Known).** Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.

**Least Concern.** Taxa that are not Threatened.

### Table B. Schedules used in the WA Wildlife Conservation Act

**Schedule 1**. Rare and Likely to become Extinct.

**Schedule 2.** Extinct.

**Schedule 3**. Migratory species listed under international treaties.

**Schedule 4**. Other Specially Protected Fauna.

**Table C. WA Department of Conservation and Land Management Priority species** (species not listed under the Conservation Act, but for which there is some concern).

**Priority 1.** Taxa with few, poorly known populations on threatened lands.

**Priority 2.** Taxa with few, poorly known populations on conservation lands; or taxa with several, poorly known populations not on conservation lands.

**Priority 3.** Taxa with several, poorly known populations, some on conservation lands.

**Priority 4.** Taxa in need of monitoring. Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change.

**Priority 5.** 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 (IUCN Conservation Dependent).

## Appendix 3. Vertebrate fauna assemblage of the study area, based on the desktop review and indicating those species confirmed to be present during BCE surveys (X).

Levels of Conservation Significance (Status) are discussed in the "Assessment of Conservation Significance" section. WAM indicates species recorded in the region by the Western Australian Museum, DEC indicates species recorded on DEC databases, Lit indicates species reported in the region from the literature. WJ indicates species recorded from Wanjarri Nature Reserve (DEC).
* indicates species previously recorded at Yeelirrie (anon. 1978).

### FROGS

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **HYLIDAE (Tree frogs)** | | | | | |
| *Cyclorana maini* | Main's Frog | | DEC WJ | | X |
| *Cyclorana platycephala* | Water-holding Frog | | WAM | | X |
| *Litoria rubella* | Desert Tree Frog | | Lit | | X |
| **MYOBATRACHIDAE (Ground frogs)** | | | | | |
| *Limnodynastes spenceri* | Spencer's Frog | | WAM | | |
| *Neobatrachus aquilonius* | Northern Burrowing Frog | | DEC WJ | | |
| *Neobatrachus centralis* | Trilling Frog | | DEC WJ | | |
| *Neobatrachus kunapalari* | Kunapalari Frog | | WAM | | |
| *Neobatrachus sutor* | Shoemaker Frog | | Lit | | |
| *Neobatrachus wilsmorei* | Wilsmore's Frog | | WAM | | |
| *Pseudophryne occidentalis* | Western Toadlet | | WAM | | X |
| **Total Species Expected: 10**<br>**Total Species Recorded: 4** | | | | **3** | **4** |

## REPTILES

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **CHELUIDAE** (freshwater tortoise) | | | | | |
| *Chelodina steindachneri* | Flat-shelled Tortoise | WAM | | | |
| **GEKKONIDAE** (geckoes) | | | | | |
| *Diplodactylus conspicillatus* | Fat-tailed Gecko | WAM | | * | X |
| *Diplodactylus granariensis rex* | Goldfields Stone Gecko | WAM | | | X |
| *Diplodactylus pulcher* | Western Saddled Ground Gecko | WAM | | | X |
| *Diplodactylus squarrosus* | Mottled Ground Gecko | WAM | | | |
| *Diplodactylus stenodactylus* | Pale-snouted Ground Gecko | Lit | | | |
| *Gehyra purpurascens* | Purple Arid Dtella | Lit | | | |
| *Gehyra punctata* | Spotted Rock Dtella | Lit | | * | |
| *Gehyra variegata* | Variegated Dtella | WAM | | * | X |
| *Heteronotia binoei* | Bynoe's Gecko | WAM | | * | X |
| *Nephrurus vertebralis* | Midline Knob-tail | WAM | | * | X |
| *Nephrurus wheeleri* | Southern Banded Knob-tail | WAM | | | |
| *Oedura marmorata* | Marbled Velvet Gecko | Lit | | | |
| *Rhynchoedura ornata* | Beaked Gecko | WAM | | | X |
| *Strophurus assimilis* | Thorn-tailed Gecko | Lit | | | |
| *Strophurus elderi* | Jewelled Gecko | WAM | | | X |
| *Strophurus strophurus* | Western Ring-tailed Gecko | WAM | | | X |
| *Strophurus wellingtonae* | Western Shield Spiny-tailed Gecko | WAM | | | X |
| *Underwoodisaurus milii* | Barking Gecko | Lit | | | |
| **PYGOPODIDAE** (legless lizards) | | | | | |
| *Aprasia picturata* | | CS2 Lit | | | |
| *Delma butleri* | Unbanded Delma | WAM | | | X |
| *Delma nasuta* | Long-nosed Delma | WAM | | | X |
| *Delma petersoni* | | WAM | | | |
| *Lialis burtonis* | Burton's Legless Lizard | WAM | | * | X |
| *Pygopus nigriceps* | Western Hooded Scaly-foot | WAM | | | X |
| **AGAMIDAE** (dragon lizards) | | | | | |
| *Caimanops amphiboluroides* | Mulga Dragon | WAM | | | |
| *Ctenophorus caudicinctus* | Ring-tailed Dragon | WAM | | * | X |
| *Ctenophorus isolepis* | Military Dragon | WAM | | * | X |
| *Ctenophorus nuchalis* | Central Netted Dragon | WAM | | * | X |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Ctenophorus reticulatus* | Western Netted Dragon | WAM | | * | |
| *Ctenophorus salinarum* | Claypan Dragon | WAM | | | |
| *Ctenophorus scutulatus* | Lozenge-marked Dragon | WAM | | | X |
| *Lophognathus longirostris* | Long-nosed Dragon | WAM | | | |
| *Moloch horridus* | Thorny Devil | WAM | | * | X |
| *Pogona minor* | Western Bearded Dragon | WAM | | * | X |
| *Tympanocryptis cephala* | Earless Pebble Dragon | WAM | | | |
| **VARANIDAE** (monitors or goannas) | | | | | |
| *Varanus brevicauda* | Short-tailed Monitor | WAM | | | |
| *Varanus caudolineatus* | Stripe-tailed Monitor | WAM | | | X |
| *Varanus eremius* | Desert Pygmy Monitor | WAM | | | X |
| *Varanus giganteus* | Perentie | Lit | | * | X |
| *Varanus gouldii* | Sand Goanna | WAM | | * | X |
| *Varanus panoptes* | Yellow-spotted Monitor | WAM | | | X |
| *Varanus tristis* | Black-headed Monitor | WAM | | * | |
| **SCINCIDAE** (skink lizards) | | | | | |
| *Cryptoblepharus buchananii* | Fence Skink | WAM | | | X |
| *Cryptoblepharus plagiocephalus* | Fence Skink | Lit | | | X |
| *Ctenotus ariadnae* | | Lit | | | X |
| *Ctenotus calurus* | | Lit | | | |
| *Ctenotus dux* | | Lit | | | |
| *Ctenotus grandis* | | Lit | | * | X |
| *Ctenotus hanloni* | | Lit | | | X |
| *Ctenotus helenae* | Clay Soil Ctenotus | WAM | | * | X |
| *Ctenotus leonhardii* | Leonhardi's Ctenotus | WAM | | * | X |
| *Ctenotus pantherinus* | Leopard Skink | WAM | | | X |
| *Ctenotus quattuordecimlineatus* | | WAM | | | |
| *Ctenotus schomburgkii* | Barred Wedge-snout Ctenotus | WAM | | * | X |
| *Ctenotus severus* | Stern Rock Ctenotus | Lit | | | |
| *Ctenotus uber* | Spotted Ctenotus | Lit | | | |
| *Egernia depressa* | Pygmy Spiny-tailed Skink | WAM | | * | X |
| *Egernia formosa* | Goldfields Crevice Skink | Lit | | | |
| *Liopholis inornata* | Desert Skink | WAM | | * | X |
| *Liopholis kintorei* | Great Desert Skink | CS1 Lit | | | |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Liopholis striata* | Night Skink | DEC | | | X |
| *Eremiascincus richardsonii* | Broad-banded Sand-swimmer | WAM | | * | X |
| *Lerista bipes* | | Lit | | | |
| *Lerista desertorum* | | WAM | | * | X |
| *Lerista rhodenoides* | | WAM | | * | X |
| *Menetia greyii* | Common Dwarf Skink | WAM | | * | X |
| *Morethia butleri* | Woodland Dark-flecked Morethia | WAM | | | X |
| *Tiliqua occipitalis* | Western Blue-tongue | Lit | | * | X |
| *Tiliqua multifasciata* | Centralian Blue-tongue | WAM | | * | X |
| **TYPHLOPIDAE** (blind snakes) | | | | | |
| *Ramphotyphlops bicolor* | Dark-spined blind snake | | | | X |
| *Ramphotyphlops hamatus* | Northern Hook-snouted Blind Snake | WAM | | | X |
| *Ramphotyphlops waitii* | Beaked Blind Snake | WAM | | | |
| **BOIDAE** (pythons) | | | | | |
| *Antaresia perthensis* | Pygmy Python | WAM | | | |
| *Antaresia stimsoni* | Stimson's Python | Lit | | | |
| **ELAPIDAE** (front-fanged snakes) | | | | | |
| *Acanthophis pyrrhus* | Desert Death Adder | WAM | | | |
| *Brachyurophis approximans* | Northern Shovel-nosed Snake | WAM | | | |
| *Brachyurophis semifasciata* | Southern Shovel-nosed Snake | DEC | | | |
| *Brachyurophis fasciolata* | Narrow-banded Shovel-nosed Snake | WAM | | | |
| *Demansia psammophis* | Yellow-faced Whipsnake | WAM | | | |
| *Parasuta monachus* | Monk Snake | WAM | | | |
| *Pseudechis australis* | Ringed Brown Snake | WAM | | | |
| *Pseudechis butleri* | Spotted Mulga Snake | Lit | | | |
| *Pseudonaja modesta* | Ringed Brown Snake | WAM | | | X |
| *Pseudonaja nuchalis* | Gwardar | WAM | | * | X |
| *Simoselaps bertholdi* | Jan's Banded Snake | WAM | | | X |
| *Furina ornata* | Moon Snake | Lit | | | |
| *Suta fasciata* | Rosen's Snake | WAM | | * | |
| **Total Species Expected: 88** | | | | | |
| **Total Species Recorded by BCE and anon. (1978): 53** | | | | **29** | **49** |

## BIRDS

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **CASUARIIDAE (Cassowaries and emus)** | | | | | |
| *Dromaius novaehollandiae* | Emu | **BA** | | * | **X** |
| **MEGAPODIIDAE (Megapodes)** | | | | | |
| *Leipoa ocellata* | Malleefowl | **CS1 Lit** | | * | **X** |
| **PHASIANIDAE (Pheasants and allies)** | | | | | |
| *Coturnix pectoralis* | Stubble Quail | **Lit** | | | |
| **ANATIDAE (swans and ducks)** | | | | | |
| *Cygnus atratus* | Black Swan | **WAM** | | * | |
| *Tadorna tadornoides* | Australian Shelduck | **Lit** | | * | **X** |
| *Anas superciliosa* | Pacific Black Duck | **Lit** | | * | |
| *Anas gracilis*l | Grey Teal | **Lit** | | * | |
| *Chenonetta jubata* | Australian Wood Duck | **Lit** | | * | |
| *Malacorhynchus membranaceus* | Pink-eared Duck | **Lit** | | | |
| *Aythya australis* | Hardhead | **Lit** | | | |
| **PODICIPEDIDAE (grebes)** | | | | | |
| *Tachybaptus novaehollandiae* | Australasian Grebe | **Lit** | | | |
| *Poliocephalus poliocephalus* | Hoary-headed Grebe | **WAM** | | * | |
| **PHALACROCORACIDAE (cormorants)** | | | | | |
| *Phalacrocorax melanoleucos* | Little Pied Cormorant | **BA** | | | |
| *Phalacrocorax varius* | Pied Cormorant | **Lit** | | | |
| *Phalacrocorax sulcirostris* | Little Black Cormorant | **Lit** | | | |
| **ARDEIDAE (herons and egrets)** | | | | | |
| *Egretta novaehollandiae* | White-faced Heron | **BA** | | * | |
| *Ardea pacifica* | White-necked Heron | **WAM** | | * | |
| *Egretta modesta* | Eastern Great Egret | **CS1 Lit** | | * | |
| *Nycticorax caledonicus* | Nankeen Night Heron | **Lit** | | | |
| **THRESKIORNITHIDAE (ibis and spoonbills)** | | | | | |
| *Threskiornis molucca* | Australian White Ibis | **Lit** | | * | |
| *Threskiornis spinicollis* | Straw-necked Ibis | **Lit** | | * | |
| **ACCIPITRIDAE (Osprey, hawks and eagles)** | | | | | |
| *Elanus axillaris* | Black-shouldered Kite | **Lit** | | | |
| *Elanus scriptus* | Letter-winged Kite | **Lit** | | * | |
| *Lophoictinia isura* | Square-tailed Kite | **CS3 Lit** | | * | |
| *Hamirostra melanosternon* | Black-breasted Buzzard | **Lit** | | | |
| *Milvus migrans* | Black Kite | **Lit** | | | |
| *Haliastur sphenurus* | Whistling Kite | **BA** | | * | **X** |
| *Circus assimilis* | Spotted Harrier | **Lit** | | | **X** |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Accipiter fasciatus* | Brown Goshawk | **Lit** | | * | |
| *Accipiter cirrhocephalus* | Collared Sparrowhawk | **Lit** | | * | **X** |
| *Aquila audax* | Wedge-tailed Eagle | **BA** | | * | **X** |
| *Hieraaetus morphnoides* | Little Eagle | **Lit** | | * | **X** |
| **FALCONIDAE (Falcons)** | | | | | |
| *Falco berigora* | Brown Falcon | **BA** | | * | **X** |
| *Falco longipennis* | Australian Hobby | **BA** | | * | **X** |
| *Falco hypoleucos* | Grey Falcon | **CS2 Lit** | | | |
| *Falco subniger* | Black Falcon | **Lit** | | | |
| *Falco peregrinus* | Peregrine Falcon | **CS1 BA** | | | **X** |
| *Falco cenchroides* | Nankeen Kestrel | **BA** | | * | **X** |
| **RALLIDAE (Rails, gallinules and coots)** | | | | | |
| *Gallinula ventralis* | Black-tailed Native-hen | **Lit** | | * | |
| *Fulica atra* | Eurasian Coot | **Lit** | | * | |
| **OTIDIDAE (Bustards)** | | | | | |
| *Ardeotis australis* | Australian Bustard | **CS2 WAM** | | * | **X** |
| **TURNICIDAE (Button-quails)** | | | | | |
| *Turnix velox* | Little Button-quail | **Lit** | | * | |
| **SCOLOPACIDAE (sandpipers)** | | | | | |
| *Limosa limosa* | Black-tailed Godwit | **CS1 Lit** | | | |
| *Tringa nebularia* | Common Greenshank | **CS1 Lit** | | | |
| *Tringa stagnatalis* | Marsh Sandpiper | **CS1 Lit** | | | |
| *Tringa hypoleucos* | Common Sandpiper | **CS1 Lit** | | | |
| *Tringa glareola* | Wood Sandpiper | **CS1 Lit** | | | |
| *Calidris ruficollis* | Red-necked Stint | **CS1 Lit** | | | |
| *Calidris acuminata* | Sharp-tailed Sandpiper | **CS1 Lit** | | * | |
| *Calidris ferruginea* | Curlew Sandpiper | **CS1 Lit** | | | |
| **BURHINIDAE (Stone-curlews)** | | | | | |
| *Burhinus grallarius* | Bush Stone-curlew | **CS2 BA** | | * | **X** |
| **RECURVIROSTRIDAE (stilts and avocets)** | | | | | |
| *Himantopus himantopus* | Black-winged Stilt | **Lit** | | * | |
| **CHARADRIIDAE (Lapwings, plovers and dotterels)** | | | | | |
| *Erythrogonys cinctus* | Red-kneed Dotterel | **Lit** | | * | |
| *Charadrius ruficapillus* | Red-capped Plover | **Lit** | | * | |
| *Charadrius melanops* | Black-fronted Dotterel | **Lit** | | * | |
| *Charadrius australis* | Inland Dotterel | **Lit** | | | |
| *Vanellus tricolor* | Banded Lapwing | **BA** | | * | **X** |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **COLUMBIDAE (Pigeons and doves)** | | | | | |
| *Phaps chalcoptera* | Common Bronzewing | **BA** | | * | **X** |
| *Ocyphaps lophotes* | Crested Pigeon | **BA** | | * | **X** |
| *Geopelia cuneata* | Diamond Dove | **Lit** | | * | |
| **CACATUIDAE (Cockatoos)** | | | | | |
| *Eolophus roseicapilla* | Galah | **BA** | | * | **X** |
| *Cacatua sanguinea* | Little Corella | **Lit** | | | |
| *Cacatua leadbeateri* | Major Mitchell's Cockatoo | **CS1 Lit** | | * | |
| *Nymphicus hollandicus* | Cockatiel | **Lit** | | * | **X** |
| **PSITTACIDAE (Parrots)** | | | | | |
| *Barnardius zonarius* | Australian Ringneck | **BA** | | * | **X** |
| *Psephotus varius* | Mulga Parrot | **BA** | | * | **X** |
| *Melopsittacus undulatus* | Budgerigar | **BA** | | * | **X** |
| *Neosephotus bourkii* | Bourke's Parrot | **BA** | | * | |
| *Neophema elegans* | Elegant Parrot | **Lit** | | * | **X** |
| *Neophema splendida* | Scarlet-chested Parrot | **CS3 Lit** | | **WJ** | |
| *Polytelis alexandrae* | Princess Parrot | **CS1 WAM** | | **WJ** | |
| *Polytelis anthopeplus* | Regent Parrot | **CS3 Lit** | | **WJ** | |
| *Pezoporus occidentalis* | Night Parrot | **CS1 Lit** | | | |
| **CUCULIDAE (Old world cuckoos)** | | | | | |
| *Cuculus pallidus* | Pallid Cuckoo | **BA** | | | **X** |
| *Chrysococcyx osculans* | Black-eared Cuckoo | **BA** | | | |
| *Chrysococcyx basalis* | Horsfield's Bronze-Cuckoo | **BA** | | | **X** |
| **STRIGIDAE (Hawk owls)** | | | | | |
| *Ninox novaeseelandiae* | Southern Boobook | **Lit** | | * | **X** |
| **TYTONIDAE (Barn owls)** | | | | | |
| *Tyto alba* | Barn Owl | **Lit** | | * | |
| **PODARGIDAE (Australian frogmouths)** | | | | | |
| *Podargus strigoides* | Tawny Frogmouth | **Lit** | | * | **X** |
| **CAPRIMULGIDAE (Nightjars and allies)** | | | | | |
| *Eurostopodus argus* | Spotted Nightjar | **BA** | | * | **X** |
| **AEGOTHELIDAE (Owlet-nightjars)** | | | | | |
| *Aegotheles cristatus* | Australian Owlet-nightjar | **BA** | | * | **X** |
| **APODIDAE (Typical swifts)** | | | | | |
| *Apus pacificus* | Fork-tailed Swift[a] | **CS1 Lit** | | * | |
| **HALCYONIDAE (Kingfishers)** | | | | | |
| *Todiramphus pyrrhopygia* | Red-backed Kingfisher | **Lit** | | * | **X** |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Todiramphus sanctus* | Sacred Kingfisher | **Lit** | | | |
| **MEROPIDAE (Bee-eaters)** | | | | | |
| *Merops ornatus* | Rainbow Bee-eater | **CS1 Lit** | | * | **X** |
| **CLIMACTERIDAE (Australo-Papuan treecreepers)** | | | | | |
| *Climacteris affinis* | White-browed Treecreeper | **BA** | | | |
| **MALURIDAE (Fairy-wrens, emu-wrens and grasswrens)** | | | | | |
| *Malurus splendens* | Splendid Fairy-wren | **BA** | | | **X** |
| *Malurus lamberti* | Variegated Fairy-wren | **BA** | | | **X** |
| *Malurus leucopterus* | White-winged Fairy-wren | **BA** | | | **X** |
| *Amytornis striatus striatus* | Striated Grasswren | **CS2 WAM** | | **WJ** | |
| *Stipiturus ruficeps* | Rufous-crowned Emu wren | **CS3 Lit** | | **WJ** | |
| **PARDALOTIDAE (Pardalotes, scrubwrens, thornbills and allies)** | | | | | |
| *Pardalotus rubricatus* | Red-browed Pardalote | **BA** | | | |
| *Pardalotus striatus* | Striated Pardalote | **BA** | | | **X** |
| *Calamanthus campestris* | Rufous Fieldwren | **Lit** | | | |
| *Pyrrholaemus brunneus* | Redthroat | **BA** | | | **X** |
| *Smicrornis brevirostris* | Weebill | **BA** | | | **X** |
| *Gerygone fusca* | Western Gerygone | **BA** | | | **X** |
| *Acanthiza apicalis* | Inland Thornbill | **BA** | | | **X** |
| *Acanthiza uropygialis* | Chestnut-rumped Thornbill | **BA** | | | **X** |
| *Acanthiza robustirostris* | Slaty-backed Thornbill | **BA** | | | **X** |
| *Acanthiza iredalei* | Slender-billed Thornbill | **CS1 Lit** | | | |
| *Acanthiza chrysorrhoa* | Yellow-rumped Thornbill | **BA** | | | **X** |
| *Aphelocephala leucopsis* | Southern Whiteface | **BA** | | | **X** |
| **MELIPHAGIDAE (Honeyeaters)** | | | | | |
| *Acanthagenys rufogularis* | Spiny-cheeked Honeyeater | **BA** | | | **X** |
| *Manorina flavigula* | Yellow-throated Miner | **BA** | | | **X** |
| *Lichenostomus virescens* | Singing Honeyeater | **BA** | | | **X** |
| *Lichenostomus penicillatus* | White-plumed Honeyeater | **BA** | | | **X** |
| *Lichenostomus plumulus* | Grey-fronted Honeyeater | **BA** | | | |
| *Lichmera indistincta* | Brown Honeyeater | **BA** | | | **X** |
| *Phylidonyris albifrons* | White-fronted Honeyeater | **BA** | | | **X** |
| *Conopophila whitei* | Grey Honeyeater | **CS3 Lit** | | | |
| *Certhionyx niger* | Black Honeyeater | **BA** | | | |
| *Certhionyx variegatus* | Pied Honeyeater | **BA** | | | |
| *Epthianura tricolor* | Crimson Chat | **BA** | | | **X** |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Epthianura aurifrons* | Orange Chat | WAM | | | |
| *Epthianura albifrons* | White-fronted Chat | Lit | | | |
| **PETROICIDAE (Robins)** | | | | | |
| *Microeca leucophaea* | Jacky Winter | BA | | | X |
| *Petroica goodenovii* | Red-capped Robin | BA | | | X |
| *Melanodryas cucullata* | Hooded Robin | BA | | | X |
| **POMATOSTOMIDAE (Babblers)** | | | | | |
| *Pomatostomus temporalis* | Grey-crowned Babbler | BA | | | X |
| *Pomatostomus superciliosus* | White-browed Babbler | BA | | | X |
| **CINCLOSOMATIDAE (Quail-thrushes and allies)** | | | | | |
| *Psophodes occidentalis* | Chiming Wedgebill | BA | | | |
| *Cinclosoma castanotum* | Chestnut Quail-thrush | BA | | | |
| *Cinclosoma casteneothorax* | Chestnut-breasted Quail-thrush | BA | | | X |
| **NEOSITTIDAE (Sitellas)** | | | | | |
| *Daphoenositta chrysoptera* | Varied Sittella | BA | | | X |
| **PACHYCEPHALIDAE (Whistlers, shrike-thrushes and allies)** | | | | | |
| *Oreoica gutturalis* | Crested Bellbird | BA | | | X |
| *Pachycephala rufiventris* | Rufous Whistler | BA | | | X |
| *Colluricincla harmonica* | Grey Shrike-thrush | BA | | | X |
| **DICRURIDAE (Monarchs, fantails and drongos)** | | | | | |
| *Grallina cyanoleuca* | Magpie-lark | BA | | | X |
| *Rhipidura fuliginosa* | Grey Fantail | Lit | | | X |
| *Rhipidura f. albicauda* | White-tailed Fantail | Lit | | | |
| *Rhipidura leucophrys* | Willie Wagtail | BA | | | X |
| **CAMPEPHAGIDAE (Cuckoo-shrikes and trillers)** | | | | | |
| *Coracina novaehollandiae* | Black-faced Cuckoo-shrike | BA | | * | X |
| *Coracina maxima* | Ground Cuckoo-shrike | BA | | * | X |
| *Lalage sueurii* | White-winged Triller | BA | | * | X |
| **ARTAMIDAE (Woodswallows, butcherbirds and currawongs)** | | | | | |
| *Artamus personatus* | Masked Woodswallow | Lit | | | X |
| *Artamus cinereus* | Black-faced Woodswallow | BA | | | X |
| *Artamus minor* | Little Woodswallow | BA | | | |
| *Cracticus torquatus* | Grey Butcherbird | BA | | | X |
| *Cracticus nigrogularis* | Pied Butcherbird | BA | | | X |
| *Gymnorhina tibicen* | Australian Magpie | BA | | | X |
| *Strepera versicolor* | Grey Currawong | BA | | WJ | X |
| **CORVIDAE (Crows and allies)** | | | | | |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| *Corvus coronoides* | Australian Raven | **Lit** | | | |
| *Corvus bennetti* | Little Crow | **BA** | | | **X** |
| *Corvus orru* | Torresian Crow | **BA** | | | **X** |
| **PTILONORHYNCHIDAE (Bowerbirds)** | | | | | |
| *Chlamydera guttata* | Western Bowerbird | **BA** | | | **X** |
| **MOTACILIDAE (Old world wagtails and pipits)** | | | | | |
| *Anthus novaeseelandiae* | Australasian Pipit | **BA** | | * | **X** |
| **PASSERIDAE (Sparrows, weaverbirds, waxbills and allies)** | | | | | |
| *Taeniopygia guttata* | Zebra Finch | **BA** | | | **X** |
| **DICAEIDAE (Flowerpeckers)** | | | | | |
| *Dicaeum hirundinaceum* | Mistletoebird | **BA** | | | **X** |
| **HIRUNDINIDAE (Swallows and martins)** | | | | | |
| *Cheramoeca leucosternum* | White-backed Swallow | **BA** | | * | **X** |
| *Hirundo neoxena* | Welcome Swallow | **BA** | | * | **X** |
| *Hirundo nigricans* | Tree Martin | **BA** | | | **X** |
| *Hirundo ariel* | Fairy Martin | **Lit** | | * | **X** |
| **SYLVIIDAE (Old world warblers)** | | | | | |
| *Cinclorhamphus mathewsi* | Rufous Songlark | **Lit** | | | |
| *Cinclorhamphus cruralis* | Brown Songlark | **Lit** | | | |
| **Total Species Expected: 155**<br>**Total Species Recorded by BCE and anon (1978): 108** | | | **155** | **66** | **82** |

## MAMMALS

Note: Old, abandoned nests constructed by the Lesser Stick-nest Rat were recorded amongst breakaway along the Barr Smith Range. This species is considered extinct with no recent records and is not included in the sum of recorded species.

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **TACHYGLOSSIDAE (Echidnas)** | | | | | |
| *Tachyglossus aculeatus* | Echidna | | WAM | | X |
| **DASYURIDAE (Dasyurids)** | | | | | |
| *Dasycercus blythi* | Brush-tailed Mulgara | CS2 | | MK | X |
| *Dasycercus cristicauda* | Crest-tailed Mulgara | CS1 | WAM | | |
| *Antechinomys laniger* | Kultarr | CS3 | WAM | WJ | |
| *Ningaui ridei* | Wongai Ningaui | | WAM | MK | X |
| *Pseudantechinus woolleyae* | Woolley's Pseudantechinus | | WAM | WJ | Scats |
| *Sminthopsis crassicaudata* | Fat-tailed Dunnart | | WAM | WJ | |
| *Sminthopsis dolichura* | Little Long-tailed Dunnart | Lit | | WJ | |
| *Sminthopsis hirtipes* | Hairy-footed Dunnart | Lit | | WJ | X |
| *Sminthopsis longicaudata* | Long-tailed Dunnart | CS2 | DEC | | |
| *Sminthopsis macruora* | Stripe-faced Dunnart | | WAM | WJ | X |
| *Sminthopsis ooldea* | Ooldea Dunnart | | WAM | WJ | X |
| **PERAMELIDAE (Bandicoots)** | | | | | |
| *Macrotis lagotis* | Greater Bilby | CS1 | WAM | | |
| **MACROPODIDAE (Kangaroos, wallabies)** | | | | | |
| *Macropus robustus* | Euro, Biggada | | WAM | WJ | X |
| *Macropus rufus* | Red Kangaroo, Marlu | | WAM | WJ | X |
| *Petrogale lateralis* | Black-flanked Rock-Wallaby | CS1 | | | Scats |
| **EMBALLONURIDAE (Sheathtail bats)** | | | | | |
| *Saccolaimus flaviventris* | Yellow-bellied Sheathtail-bat Bat | | | | X |
| *Taphozous hillli* | Hill`s Sheathtail-bat | Lit | | | |
| **VESPERTILIONIDAE (Vespertillionid bats)** | | | | | |
| *Chalinolobus gouldii* | Gould's Wattled Bat | | WAM | WJ | X |
| *Nyctophilus geoffroyi* | Lesser Long-eared Bat | | WAM | WJ | X |
| *Nyctophilus major tor* | Inland Greater Long-eared Bat | CS2 | | | X |
| *Scotorepens balstoni* | Inland Broad-nosed Bat | | WAM | WJ | X |
| *Vespadelus baverstocki* | Inland Forest Bat | Lit | | WJ | X |
| *Vespadelus finlaysoni* | Finlayson's Cave Bat | | WAM | | X |
| *Vespadelus regulus* | Southern Forest Bat | | WAM | WJ | |

| Species | | Status | Source | Local Records | BCE |
|---|---|---|---|---|---|
| **MOLOSSIDAE (Freetail bats)** | | | | | |
| *Mormopterus* sp. 3 (Adams *et al.*,1988). | Inland Freetail-bat | **Lit** | | | **X** |
| *Austronomus australis* | White-striped Freetail-bat | **WAM** | | **WJ** | **X** |
| **MURIDAE (Rats and mice)** | | | | | |
| *Mus musculus* | House Mouse | **INT WAM** | | **MK** | |
| *Notomys alexis* | Spinifex Hopping-Mouse | **WAM** | | **MK** | **X** |
| *Pseudomys desertor* | Desert Mouse | **CS3 Lit** | | **MK** | |
| *Pseudomys hermannsburgensis* | Sandy Inland Mouse | **WAM** | | **MK** | |
| **LEPORIDAE (Rabbits and hares)** | | | | | |
| *Oryctolagus cuniculus* | Rabbit | **INT Lit** | | | **X** |
| **CANIDAE (Dogs and foxes)** | | | | | |
| *Canis lupus* | Dog/Dingo | **Lit** | | | **X** |
| *Vulpes vulpes* | Red Fox | **INT Lit** | | | **X** |
| **FELIDAE (Cats)** | | | | | |
| *Felis catus* | Cat | **INT Lit** | | | **X** |
| **BOVIDAE (Horned ruminants)** | | | | | |
| *Capra hircus* | Goat | **INT Lit** | | | |
| **EQUIDAE (horses)** | | | | | |
| *Equus asinus* | Donkey | **INT Lit** | | | |
| *Equus caballus* | Horse | **INT Lit** | | | |
| **CAMELIDAE (camels)** | | | | | |
| *Camelus dromedarius* | Camel | **INT Lit** | | | **X** |
| **Native Species Expected: 31**<br>**Native Species Recorded by BCE: 21**<br>**Introduced Species Expected: 8**<br>**Introduced Species Recorded: 4** | | | | **21** | **25** |

## Species considered extinct in the Statement Agreement Area

| Common Name | Species Name |
|---|---|
| Thick-billed Grasswren | *Amytornis textilis* |
| Chuditch | *Dasyurus geoffroii* |
| Boodie | *Bettongia lesueur* |
| Rufous Hare-Wallaby | *Lagorchestes hirsutus* |
| Ghost Bat | *Macroderma gigas* |
| Golden Bandicoot | *Isoodon auratus* |
| Pig-footed Bandicoot | *Chaeropus ecaudatus* |
| Lesser Stick-nest Rat | *Leporillus apicalis* |

Note that this list is probably incomplete and the past status of some of these species in the area is uncertain. With the exception of the Lesser Stick-nest Rat and the Pig-footed Bandicoot, all species are extant elsewhere.

**Appendix 4. GPS locations, survey periods and traps used at each sampling location.**

| Sample Location | Easting WGS84 | Northing Zone: 50J | Surveyed in March 2009 | Surveyed in November 2009 | Trap Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | Pit | Funnel | Elliott |
| 1.1 | 787620 | 6990787 | + | + | P | | E |
| 1.2 | 787578 | 6990788 | + | + | P | F | |
| 1.3 | 787537 | 6990793 | + | + | P | | E |
| 1.4 | 787506 | 6990785 | + | + | P | F | |
| 1.5 | 787408 | 6990754 | + | + | P | | E |
| 1.6 | 787365 | 6990732 | + | + | P | F | |
| 1.7 | 787324 | 6990737 | + | + | P | | E |
| 1.8 | 787287 | 6990722 | + | + | P | F | |
| 1.9 | 787241 | 6990718 | + | + | P | | E |
| 1.10 | 787171 | 6990693 | + | + | P | F | |
| 2.1 | 787532 | 6990497 | + | + | P | | E |
| 2.2 | 787483 | 6990495 | + | + | P | F | |
| 2.3 | 787426 | 6990486 | + | + | P | | E |
| 2.4 | 787367 | 6990488 | + | + | P | F | |
| 2.5 | 787300 | 6990499 | + | + | P | | E |
| 2.6 | 787239 | 6990514 | + | + | P | F | |
| 2.7 | 787186 | 6990509 | + | + | P | | E |
| 2.8 | 787122 | 6990502 | + | + | P | F | |
| 2.9 | 787066 | 6990471 | + | + | P | | E |
| 2.10 | 787027 | 6990447 | + | + | P | F | |
| 3.1 | 787463 | 6990269 | + | + | P | | E |
| 3.2 | 787397 | 6990243 | + | + | P | F | |
| 3.3 | 787371 | 6990212 | + | + | P | | E |
| 3.4 | 787308 | 6990197 | + | + | P | F | |
| 3.5 | 787263 | 6990229 | + | + | P | | E |
| 3.6 | 787235 | 6990259 | + | + | P | F | |
| 3.7 | 787211 | 6990268 | + | + | P | | E |
| 3.8 | 787145 | 6990296 | + | + | P | F | |
| 3.9 | 787087 | 6990296 | + | + | P | | E |
| 3.10 | 787028 | 6990321 | + | + | P | F | |
| 4.1 | 787051 | 6989459 | + | + | P | | E |

| Sample Location | Easting WGS84 | Northing Zone: 50J | Surveyed in March 2009 | Surveyed in November 2009 | Trap Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | Pit | Funnel | Elliott |
| 4.2 | 787025 | 6989466 | + | + | P | F | |
| 4.3 | 786978 | 6989461 | + | + | P | | E |
| 4.4 | 786938 | 6989473 | + | + | P | F | |
| 4.5 | 786900 | 6989486 | + | + | P | | E |
| 4.6 | 786861 | 6989490 | + | + | P | F | |
| 4.7 | 786821 | 6989506 | + | + | P | | E |
| 4.8 | 786792 | 6989539 | + | + | P | F | |
| 4.9 | 786751 | 6989573 | + | + | P | | E |
| 4.10 | 786706 | 6989590 | + | + | P | F | |
| 5.1 | 783115 | 6989307 | + | + | P | | E |
| 5.2 | 783140 | 6989331 | + | + | P | F | |
| 5.3 | 783165 | 6989368 | + | + | P | | E |
| 5.4 | 783204 | 6989388 | + | + | P | F | |
| 5.5 | 783251 | 6989405 | + | + | P | | E |
| 5.6 | 783286 | 6989394 | + | + | P | F | |
| 5.7 | 783323 | 6989374 | + | + | P | | E |
| 5.8 | 783358 | 6989401 | + | + | P | F | |
| 5.9 | 783397 | 6989421 | + | + | P | | E |
| 5.10 | 783424 | 6989459 | + | + | P | F | |
| 6.1 | 782704 | 6989852 | + | + | P | | E |
| 6.2 | 782757 | 6989850 | + | + | P | F | |
| 6.3 | 782804 | 6989848 | + | + | P | | E |
| 6.4 | 782840 | 6989848 | + | + | P | F | |
| 6.5 | 782885 | 6989848 | + | + | P | | E |
| 6.6 | 782931 | 6989858 | + | + | P | F | |
| 6.7 | 782982 | 6989851 | + | + | P | | E |
| 6.8 | 783015 | 6989844 | + | + | P | F | |
| 6.9 | 783070 | 6989848 | + | + | P | | E |
| 6.10 | 783108 | 6989830 | + | + | P | F | |
| 7.1 | 782793 | 6993881 | + | + | P | | E |
| 7.2 | 782811 | 6993891 | + | + | P | F | |
| 7.3 | 782855 | 6993911 | + | + | P | | E |
| 7.4 | 782914 | 6993921 | + | + | P | F | |
| 7.5 | 782959 | 6993923 | + | + | P | | E |
| 7.6 | 783004 | 6993919 | + | + | P | F | |
| 7.7 | 783042 | 6993923 | + | + | P | | E |

| Sample Location | Easting WGS84 | Northing Zone: 50J | Surveyed in March 2009 | Surveyed in November 2009 | Trap Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | Pit | Funnel | Elliott |
| 7.8 | 783094 | 6993914 | + | + | P | F | |
| 7.9 | 783127 | 6993922 | + | + | P | | E |
| 7.10 | 783144 | 6993942 | + | + | P | F | |
| 8.1 | 782753 | 6994305 | + | + | P | | E |
| 8.2 | 782801 | 6994277 | + | + | P | F | |
| 8.3 | 782844 | 6994277 | + | + | P | | E |
| 8.4 | 782867 | 6994240 | | + | P | F | |
| 8.5 | 782912 | 6994230 | | + | P | | E |
| 8.6 | 782940 | 6994211 | | + | P | F | |
| 8.7 | 782981 | 6994215 | | + | P | | E |
| 8.8 | 783028 | 6994209 | | + | P | F | |
| 8.9 | 783072 | 6994181 | | + | P | | E |
| 8.10 | 783092 | 6994154 | | + | P | F | |
| 9.1 | 782881 | 6998560 | + | + | P | F | |
| 9.2 | 782918 | 6998571 | + | + | P | | E |
| 9.3 | 782951 | 6998572 | + | + | P | F | |
| 9.4 | 782987 | 6998577 | + | + | P | | E |
| 9.5 | 783024 | 6998582 | + | + | P | F | |
| 9.6 | 783062 | 6998596 | + | + | P | | E |
| 9.7 | 783100 | 6998594 | + | + | P | F | |
| 9.8 | 783136 | 6998587 | + | + | P | | E |
| 9.9 | 783171 | 6998595 | + | + | P | F | |
| 9.10 | 783209 | 6998596 | + | + | P | | E |
| 10.1 | 782901 | 6999612 | + | + | P | F | |
| 10.2 | 782940 | 6999633 | + | + | P | | E |
| 10.3 | 782983 | 6999643 | + | + | P | F | |
| 10.4 | 783019 | 6999642 | + | + | P | | E |
| 10.5 | 783054 | 6999647 | + | + | P | F | |
| 10.6 | 783087 | 6999650 | + | + | P | | E |
| 10.7 | 783126 | 6999656 | + | + | P | F | |
| 10.8 | 783168 | 6999655 | + | + | P | | E |
| 10.9 | 783206 | 6999644 | + | + | P | F | |
| 10.10 | 783236 | 6999644 | + | + | P | | E |
| 11.1 | 785413 | 6992538 | | + | P | F | |
| 11.2 | 785394 | 6992510 | | + | P | F | E |
| 11.3 | 785371 | 6992473 | | + | P | F | |

| Sample Location | Easting WGS84 | Northing Zone: 50J | Surveyed in March 2009 | Surveyed in November 2009 | Trap Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | Pit | Funnel | Elliott |
| 11.4 | 785359 | 6992450 | | + | P | F | E |
| 11.5 | 785339 | 6992426 | | + | P | F | |
| 11.6 | 785316 | 6992401 | | + | P | F | E |
| 11.7 | 785301 | 6992373 | | + | P | F | |
| 11.8 | 785287 | 6992326 | | + | P | F | E |
| 11.9 | 785245 | 6992316 | | + | P | F | |
| 11.10 | 785208 | 6992297 | | + | P | F | E |
| 12.1 | 789353 | 6989950 | | + | P | F | |
| 12.2 | 789324 | 6989941 | | + | P | F | E |
| 12.3 | 789300 | 6989943 | | + | P | F | |
| 12.4 | 789240 | 6989949 | | + | P | F | E |
| 12.5 | 789217 | 6989969 | | + | P | F | |
| 12.6 | 789189 | 6989962 | | + | P | F | E |
| 12.7 | 789124 | 6989923 | | + | P | F | |
| 12.8 | 789097 | 6989893 | | + | P | F | E |
| 12.9 | 789072 | 6989862 | | + | P | F | |
| 12.10 | 789060 | 6989818 | | + | P | F | E |
| 13.1 | 785860 | 6992309 | | + | P | F | |
| 13.2 | 785836 | 6992294 | | + | P | F | E |
| 13.3 | 785810 | 6992276 | | + | P | F | |
| 13.4 | 785779 | 6992263 | | + | P | F | E |
| 13.5 | 785754 | 6992239 | | + | P | F | |
| 13.6 | 785722 | 6992201 | | + | P | F | E |
| 13.7 | 785696 | 6992178 | | + | P | F | |
| 13.8 | 785681 | 6992111 | | + | P | F | E |
| 13.9 | 785641 | 6992082 | | + | P | F | |
| 13.10 | 785621 | 6992051 | | + | P | F | E |
| 14.1 | 789607 | 6995885 | | + | P | F | |
| 14.2 | 789573 | 6995899 | | + | P | F | E |
| 14.3 | 789545 | 6995920 | | + | P | F | |
| 14.4 | 789511 | 6995937 | | + | P | F | E |
| 14.5 | 789462 | 6995959 | | + | P | F | |
| 14.6 | 789434 | 6995970 | | + | P | F | E |
| 14.7 | 789395 | 6995980 | | + | P | F | |
| 14.8 | 789365 | 6995988 | | + | P | F | E |
| 14.9 | 789332 | 6995991 | | + | | 2F | |

| Sample Location | Easting WGS84 | Northing Zone: 50J | Surveyed in March 2009 | Surveyed in November 2009 | Trap Type | | |
|---|---|---|---|---|---|---|---|
| | | | | | Pit | Funnel | Elliott |
| 14.10 | 789289 | 6995999 | | + | P | 2F | E |
| 15.1 | 788583 | 6991922 | | + | P | F | |
| 15.2 | 788572 | 6991940 | | + | P | F | E |
| 15.3 | 788565 | 6991965 | | + | P | F | |
| 15.4 | 788550 | 6991980 | | + | P | F | E |
| 15.5 | 788525 | 6991989 | | + | P | F | |
| 15.6 | 788515 | 6992006 | | + | P | F | E |
| 15.7 | 788501 | 6992024 | | + | P | F | |
| 15.8 | 788482 | 6992058 | | + | P | F | E |
| 15.9 | 788475 | 6992085 | | + | P | F | |
| 15.10 | 788458 | 6992099 | | + | P | F | E |

## Appendix 5. Vegetation and soil description of each sampling point

| Site | Pit | Vegetation / Site description |
|---|---|---|
| 1 | 1 | Eucalyptus gypsophila woodland on calcrete rise with a shrubby understorey |
| 1 | 2 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 3 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 4 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 5 | Eucalyptus gypsophila woodland on calcrete rise |
| 1 | 6 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 7 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 8 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 9 | Eucalyptus gypsophila woodland on calcrete rise with dense leaf litter |
| 1 | 10 | Eucalyptus gypsophila woodland on calcrete rise |
| 2 | 1 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 2 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 3 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 4 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 5 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 6 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 7 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 8 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 9 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 2 | 10 | Chenopod (Maireana pyrimidata and Atriplex sp.) shrubland on self mulching clays |
| 3 | 1 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 2 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 3 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 4 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 5 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 6 | Melaleuca xerophila open woodland over clay/clay loam flats |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| 3 | 7 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 8 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 9 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 3 | 10 | Melaleuca xerophila open woodland over clay/clay loam flats |
| 4 | 1 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 2 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 3 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 4 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) with no understorey on red sandy loam |
| 4 | 5 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) with no understorey on red sandy loam |
| 4 | 6 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 7 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 8 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 9 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. with very sparse grass & low shrub understorey on red sandy loam |
| 4 | 10 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. with very sparse grass & low shrub understorey on red sandy loam |
| 5 | 1 | Open Mulga (*Acacia ayresiana* and *A. aneura*) shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*Triodia basedowii*) ground cover |
| 5 | 2 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 5 | 3 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 5 | 4 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 5 | 5 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 5 | 6 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 5 | 7 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| 5 | 8 | Open Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 5 | 9 | Open Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 5 | 10 | Open Mulga (*Acacia ayresiana* and *A. aneura*) and *Grevillea* spp. shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 6 | 1 | Open Mulga (*Acacia ayresiana* and *A. aneura*) and isolated *Eucalyptus* spp.Woodland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 6 | 2 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 6 | 3 | Open mixed shrub overstorey with open Spinifex (*T. basedowii*) ground cover |
| 6 | 4 | Open mixed shrub overstorey with open Spinifex (*T. basedowii*) ground cover |
| 6 | 5 | Open mixed shrub overstorey with open Spinifex (*T. basedowii*) ground cover |
| 6 | 6 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and open Spinifex (*T. basedowii*) ground cover |
| 6 | 7 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 6 | 8 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 6 | 9 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 6 | 10 | Open Mulga (*Acacia ayresiana* and *A. aneura*) Shrubland with scattered *Eremophila* spp. midstorey and scattered Spinifex (*T. basedowii*) ground cover |
| 7 | 1 | Open Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 2 | Open Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 3 | Open Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 4 | Open Mulga (*Acacia ayresiana* and *A. aneura*) with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 5 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 6 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 7 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| 7 | 8 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 9 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 7 | 10 | Open mixed shrubland with very sparse shrub understorey on sandy loam soils with a thin surface crust |
| 8 | 1 | Calcrete clay loam, Open *E. gypsophila*, *Casuarina pauper* and *Acacia burkittii* woodland over sparse low shrub |
| 8 | 2 | Orange clay loam, open *Acacia* spp. shrubland over low shrubs |
| 8 | 3 | Orange clay loam with calcrete stones, Open *C. pauper* woodland over open *Acacia* spp. shrublands |
| 8 | 4 | Orange clay loam with calcrete stones, Open *Acacia* spp. shrubland over sparse shrublands |
| 8 | 5 | Pale orange clay loam with calcrete, Open *E. gypsophila* woodland with very sparse low shrub |
| 8 | 6 | Pale orange clay loam with calcrete, Open *E. gypsophila* woodland, open *Acacia* shrublands |
| 8 | 7 | Pale orange clay loam with calcrete, Open *C. pauper* woodland, over low *Acacia spp.* shrubs |
| 8 | 8 | Pale orange clay loam with calcrete, Open *Acacia* spp. woodland, over sparse open shrubs |
| 8 | 9 | Orange/red loamy clay, Open mixed *Acacia* spp. woodland over low open shrubs |
| 8 | 10 | Calcrete clay loam, Open *E. gypsophila* and *C. pauper* woodland over sparse low shrub |
| 9 | 1 | Scattered Mulga (*Acacia ayresiana* and *A. aneura*) over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 2 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 3 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 4 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 5 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 6 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 7 | Open mixed *Acacia* spp. shrubland ver open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 8 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 9 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 9 | 10 | Sparse mixed *Acacia* spp. over open Spinifex (*T. basedowii*) on red sandy loam |
| 10 | 1 | Open *Acacia* spp. dominant mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| 10 | 2 | Open *Acacia* spp. dominant mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 10 | 3 | Open *Acacia* spp. dominant mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 10 | 4 | Open Spinifex (*T. basedowii*) ground cover with scattered *Acacia* spp. shrubs and Mallee (*Eucalyptus* spp.) |
| 10 | 5 | Open Spinifex (*T. basedowii*) ground cover with scattered *Acacia* spp. shrubs and Mallee (*Eucalyptus* spp.) |
| 10 | 6 | Open Spinifex (*T. basedowii*) ground cover with scattered *Acacia* spp. shrubs and Mallee (*Eucalyptus* spp.) |
| 10 | 7 | Open *Acacia* spp. mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 10 | 8 | Open *Acacia* mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 10 | 9 | Open *Acacia* mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 10 | 10 | Open *Acacia* mixed shrubland with open Spinifex (*T. basedowii*) ground cover on red sandy clay-loam |
| 11 | 1 | Red clay with stony calcrete, Open *Acacia* spp. shrubland over low shrubs |
| 11 | 2 | Red clay with stony calcrete, Open *Acacia spp.* shrubland over low shrubs |
| 11 | 3 | Stony calcrete clay, Mixed open *Acacia* spp. shrubland with very sparse groundlayer |
| 11 | 4 | Stony calcrete clay, Mixed open *Acacia* spp. shrubland with very sparse groundlayer |
| 11 | 5 | Stony calcrete clay, Mixed open *Acacia* spp. shrubland with very sparse groundlayer |
| 11 | 6 | Stony calcrete clay, Sparse *E. gypsophila* over mixed open *Acacia* spp. shrubland with very sparse groundlayer |
| 11 | 7 | Stony calcrete clay, Open *C. pauper* woodland over mixed open *Acacia spp.* shrubland with very sparse groundlayer |
| 11 | 8 | Stony calcrete clay, Open *C. pauper* woodland over mixed open *Acacia* spp. shrubland with very sparse groundlayer |
| 11 | 9 | Stoney calcrete clay, Sparse low *Acacia* spp. shrubland |
| 11 | 10 | Stony calcrete clay, Open *E. gypsophila* over open *Acacia* spp. shrubland |
| 12 | 1 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 2 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 3 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| | | *Acacia*, some stoney calcrete |
| 12 | 4 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 5 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 6 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 7 | Tall *Lycium australe* shrubland on flats with variable clay content, with very sparse low *Acacia*, some stoney calcrete |
| 12 | 8 | Stoney calcrete clay/loam, Open mixed *Acacia* spp. shrubland |
| 12 | 9 | Stoney calcrete clay/loam, Open mixed *Acacia* spp. shrubland |
| 12 | 10 | Stoney calcrete clay/loam, *Melaleuca xerophila/Acacia* spp. shrubland |
| 13 | 1 | Stoney calcrete clay/loam, *E. gypsophila* woodland over mixed *Acacia* spp. shrubland |
| 13 | 2 | Stoney calcrete clay/loam, *E. gypsophila* woodland over mixed *Acacia* spp. shrubland |
| 13 | 3 | Stoney calcrete clay/loam, *E. gypsophila* woodland over mixed *Acacia* spp. shrubland |
| 13 | 4 | Stoney calcrete clay/loam, *E. gypsophila* woodland over mixed *Acacia* spp. shrubland |
| 13 | 5 | Stoney calcrete clay/loam, *E. gypsophila* woodland over mixed *Acacia* spp. shrubland |
| 13 | 6 | Stoney calcrete clay/loam, Open *E. gypsophila* woodland with very sparse shrub layer |
| 13 | 7 | Stoney calcrete clay/loam, Open *E. gypsophila* woodland with very sparse shrub layer |
| 13 | 8 | Stoney calcrete clay, Open *Acacia* spp. shrubland |
| 13 | 9 | Red loamy clay, Mixed *Acacia* spp. shrubland |
| 13 | 10 | Stony calcrete clay loam, Open *E. gypsophila* woodland over mixed open *Acacia spp.* Shrubland |
| 14 | 1 | Open Mallee (*Eucalyptus* spp.) and mixed *Acacia* spp. woodland over *T. basedowii* hummock grassland on red sandy loam |
| 14 | 2 | Open Mallee (*Eucalyptus* spp.) and mixed *Acacia* spp. woodland over hummock grassland on red sandy loam |
| 14 | 3 | Open Mallee (*Eucalyptus* spp.) and mixed *Acacia* spp. woodland over hummock grassland on red sandy loam |
| 14 | 4 | Open Mallee (*Eucalyptus* spp.) and mixed *Acacia* spp. woodland over hummock grassland on red sandy loam |
| 14 | 5 | Open Mallee (*Eucalyptus* spp.) and mixed *Acacia* spp. woodland over hummock grassland on red sandy loam |
| 14 | 6 | Closed mixed *Acacia* spp. woodland over open shrub layer and sparse hummock grasses on |

| Site | Pit | Vegetation / Site description |
|---|---|---|
| | | red sandy loam |
| 14 | 7 | Mulga (*Acacia ayresiana* and *A. aneura*) shrubland (closed) with scattered Mallee (*Eucalyptus* spp.) over shrubs |
| 14 | 8 | Mulga (*Acacia ayresiana* and *A. aneura*) shrubland (closed) over shrubs |
| 14 | 9 | Mixed open *Acacia* spp. shrubland over mixed shrubs and sparse hummock grass |
| 14 | 10 | Closed *Acacia* spp. shrubland over mixed shrubs and hummocks |
| 15 | 1 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 2 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 3 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 4 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 5 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 6 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 7 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 8 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 9 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |
| 15 | 10 | Closed *Acacia* spp. shrubland over hummock grass on red sandy loam |

**Appendix 6: Fauna capture results for each survey site (Tables A-C).**

Note the capture data are divided into two survey phases: Phase 1 (March 2009) and Phase 2 (November 2009). Opportunistic records (O) and total number of individuals captured (T) are listed.

**Table A. REPTILES**

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | | |
| **Species** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diplodactylus conspicillatus* | | | | | | | | | | 2 | | 1 | | | | 1 | | | | | | | | | | | | | | | 10 | 14 |
| *Diplodactylus granariensis* | | | | | | | | | | | | | | | | 2 | | 1 | | | | | | | | | | | | 1 | 2 | 6 |
| *Diplodactylus pulcher* | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | 0 | 1 |
| *Gehyra varigata* | | 14 | | 1 | | | | | | | | | 1 | | | 2 | | | | 1 | | | | 2 | | 1 | | 1 | | | 4 | 27 |
| *Heteronotia binoei* | | 1 | | | | 3 | | | | | | | 1 | | | | | | | | | 2 | | | | | | | | | 0 | 7 |
| *Nephrurus vertebralis* | | | | | 1 | 1 | 1 | | | | | 3 | 1 | | | 2 | | | | | | | | 2 | | | | | | | 0 | 11 |
| *Rhynchoedura ornata* | | 3 | | | | | | | | | | | | | | 2 | 2 | | | | | | | | | | | | | 1 | 20 | 28 |
| *Strophurus elderi* | | | | | | | | | | | | | | | | | 2 | 4 | | | | | | | | | | | | | 10 | 16 |
| *Strophurus strophurus* | | | | | | | | | | | | | | | | 1 | | | | | | | | 1 | | | | | | | 4 | 6 |

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | | |
| *Strophurus wellingtonae* | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | 2 | 3 |
| *Delma butleri* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| *Delma nasuta* | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 2 | 3 |
| *Lialis burtonis* | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | 5 | 6 |
| *Pygopus nigriceps* | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | 2 | 3 |
| *Ctenophorus caudicinctus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7 | 7 |
| *Ctenophorus isolepis* | | | | | | | | | | 1 | | | | | | | 4 | 2 | 6 | 5 | | | | | | | | | | | 7 | 25 |
| *Ctenophorus nuchalis* | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 |
| *Ctenophorus scutulatus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| *Moloch horridus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| *Pogona minor* | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | 1 |
| *Varanus caudolineatus* | | | | | | | 2 | | 1 | | | | | 1 | | | | | | | | | | | | | | | | | 0 | 4 |
| *Varanus eremius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| *Varanus giganteus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 |
| *Varanus gouldii* | | | | | | | | | | | | | | 1 | | | | 2 | | 2 | | | | | | | | | | | 0 | 5 |
| *Varanus panoptes* | | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | | | | 1 | | | 2 | 5 |

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | | |
| *Cryptoblepharus buchananii* | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | | | 1 | | | | | 2 | 5 |
| *Cryptoblepharus plagiocephalus* | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | 0 | 1 |
| *Ctenotus ariadnae* | | | | | | | | | | | | | | | | | 2 | | 1 | | | | | | | | | | | | 0 | 3 |
| *Ctenotus grandis* | | | | | | | | | | | | | | | | | 1 | | 6 | | | | | | | | | | | | 0 | 7 |
| *Ctenotus hanloni* | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 0 | 1 |
| *Ctenotus helenae* | | | | | | | | | | | | | | | | | 11 | 4 | 13 | 3 | | | | | | | | | | | 0 | 31 |
| *Ctenotus leonhardii* | | | | | | | | | 6 | | 5 | 10 | | | | | 1 | | | | | | | | | | | 1 | | 4 | 0 | 27 |
| *Ctenotus pantherinus* | | | | | | | | | | | | | | | | | | 2 | 1 | | | | | | | | | | | | 0 | 3 |
| *Ctenotus schomburgkii* | | | | | | | 1 | 1 | 2 | 1 | | 1 | 5 | 4 | | 3 | | | | | | | | | | | | | | | 4 | 22 |
| *Egernia depressa* | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | 6 | 8 |
| *Egernia inornata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 |
| *Egernia striata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| *Eremiascincus richardsoni* | | | | | | 2 | | | | | | | | | 1 | 4 | | | | | | | | | | 1 | | | | | 0 | 8 |
| *Lerista desertorum* | 1 | | | 1 | | | | | | 1 | | | | | | 1 | | | | | | | | | | | | | | | 0 | 4 |

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | | |
| *Lerista rhodonoides* | 1 | | | | | 1 | | | | | | 1 | | | | | 2 | | 1 | 1 | | | | 1 | | | | | | | 0 | 8 |
| *Mentia greyii* | | 1 | 2 | | | | 3 | 3 | 2 | 1 | | 1 | 2 | | | | | | 3 | 1 | | | | | | | | | | | 0 | 19 |
| *Morethia butleri* | | | | 1 | | | | | | | | | 2 | | | 3 | | | | | | | | | | 1 | | | | | 0 | 7 |
| *Tiliqua occipitalis* | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 0 | 1 |
| *Tiliqua multifasciata* | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | 1 | 3 |
| *Ramphotyphlops hamatus* | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | 1 |
| *Ramphotyphlops bicolor* | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 0 | 1 |
| *Pseudonaja modesta* | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 | 0 | 2 |
| *Pseudonaja nuchalis* | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 |
| *Simoselaps bertholdii* | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | 1 | 4 |
| **Total** | **2** | **21** | **2** | **6** | **1** | **8** | **7** | **5** | **11** | **7** | **5** | **19** | **13** | **6** | **1** | **22** | **27** | **18** | **32** | **14** | **0** | **3** | **0** | **9** | **0** | **3** | **0** | **3** | **0** | **7** | **103** | **355** |

**Table B. MAMMALS**

Note some species were recorded only by the presence of burrow systems (B), tracks (T) or scats (S).

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | | |
| **Species** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tachyglossus aculeatus* | | | | | | | T | | | | | T | | T | | | T | | T | T | | | | | | | | | | | 5 | 5 |
| *Dasycercus blythi* | | | | | | | | | | | | 1 | | | | | | | 8 | 5 | | | | | | | | | | | SB | 14 |
| *Pseudantechinus woolleyae* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | S | |
| *Sminthopsis hirtipes* | | | | | | | | | | 1 | | 1 | | | | | 1 | 3 | | | | | | | | 1 | | | | | 0 | 7 |
| *Sminthopsis macroura* | | | 1 | 4 | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | 0 | 6 |
| *Sminthopsis ooldea* | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 0 | 1 |
| *Ningaui ridei* | | | | | | | | | | 2 | 1 | | | | | | 4 | 6 | 2 | 4 | | | | | | | | | | | 0 | 19 |
| *Petrogale lateralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | S | 0 |
| *Macropus robustus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 22 | 22 |
| *Macropus rufus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | 6 |
| *Notomys alexis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | B | |
| *Bos taurus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | S | |

| SURVEY SITE | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | O | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SURVEY PHASE** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | | |
| *Canis lupis dingo* | | | | T | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | 7 | 8 |
| *Felis catus* | | | | | | | | | | | | | | | | | | T | T | T | | | | | | | | | | | 2 | 2 |
| *Oryctolagus cuniculus* | | | T | 1 | | S | T | | | | | | | | | | T | T | T | T | | | | | | | | | | | 2 | 3 |
| *Vulpes vulpes* | | | | | | | T | | | | | | | | | | | | | | | | | | | | | | | | T | |
| **Total** | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 5 | 9 | 10 | 10 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 44 | 93 |

**Table C. Targeted significant fauna survey transects through study area (Zone 50J and 51J)**

| Transect Number | Number Personnel | Start Easting | Northing | End Easting | Northing | Area (ha) |
|---|---|---|---|---|---|---|
| July 2009 | | | | | | |
| 1 | 4 | 789561 | 6994507 | 788649 | 6994408 | 10 |
| 2 | 4 | 788620 | 6994234 | 789553 | 6993984 | 10 |
| 3 | 4 | 789603 | 6995176 | 790539 | 6994814 | 10 |
| 4 | 4 | 790485 | 6994957 | 789619 | 6995495 | 10 |
| November 2009 | | | | | | |
| 5 | 4 | 789530 | 6993295 | 790497 | 6993227 | 10 |
| 6 | 4 | 790497 | 6993227 | 790527 | 6992241 | 10 |
| 7 | 5 | 789530 | 6993295 | 787960 | 6993251 | 15 |
| 8 | 5 | 787927 | 6992778 | 789502 | 6992786 | 15 |
| 9 | 4 | 782694 | 6989860 | 783694 | 6989865 | 10 |
| 10 | 4 | 783740 | 6989697 | 782687 | 6989699 | 10 |
| 11 | 4 | 782888 | 6999620 | 783889 | 6999621 | 10 |
| 12 | 4 | 783878 | 6999518 | 782879 | 6999520 | 10 |
| 13 | 4 | 789595 | 6995161 | 787580 | 6995154 | 20 |
| 14 | 4 | 787579 | 6994897 | 789590 | 6994900 | 20 |
| 15 | 2 | 794920 | 6989518 | 794929 | 6990037 | 2.5 |
| 16 | 2 | 795288 | 6990047 | 795264 | 6989116 | 5 |
| 17 | 2 | 204662 | 6986874 | 204657 | 6986393 | 2.5 |
| 18 | 2 | 204338 | 6986404 | 204338 | 6986966 | 2.5 |
| 19 | 2 | 211180 | 6983636 | 211180 | 6984636 | 5 |
| 20 | 2 | 211100 | 6984632 | 211100 | 6983643 | 5 |
| 21 | 2 | 211680 | 6982332 | 211253 | 6982352 | 2.5 |
| 22 | 2 | 211242 | 6982401 | 211660 | 6982425 | 2.5 |
| 23 | 2 | 203843 | 6989262 | 203843 | 6989262 | 2.5 |
| May 2010 | | | | | | |
| 1 | 3 | 789500 | 6991500 | 790500 | 6991600 | 10 |
| 2 | 3 | 789500 | 6991600 | 790500 | 6991700 | 10 |
| 3 | 3 | 788500 | 6991600 | 789500 | 6991700 | 10 |
| 4 | 3 | 788500 | 6991700 | 789500 | 6991800 | 10 |
| 5 | 3 | 789500 | 6991700 | 790500 | 6991800 | 10 |
| 6 | 3 | 788500 | 6991800 | 789500 | 6991900 | 10 |
| 7 | 3 | 789500 | 6991800 | 790500 | 6991900 | 10 |
| 8 | 3 | 788500 | 6991900 | 789500 | 6992000 | 10 |
| 9 | 3 | 789500 | 6991900 | 790500 | 6992000 | 10 |
| 10 | 3 | 788500 | 6992000 | 789500 | 6992100 | 10 |
| 11 | 3 | 789500 | 6992000 | 790500 | 6992100 | 10 |
| 12 | 3 | 788500 | 6992100 | 789500 | 6992200 | 10 |
| 13 | 3 | 789500 | 6992100 | 790500 | 6992200 | 10 |
| 14 | 3 | 788500 | 6992200 | 789500 | 6992300 | 10 |
| 15 | 3 | 789500 | 6992200 | 790500 | 6992300 | 10 |
| 16 | 3 | 788500 | 6992300 | 789500 | 6992400 | 10 |
| 17 | 3 | 789500 | 6992300 | 790500 | 6992400 | 10 |

| Transect Number | Number Personnel | Start Easting | Northing | End Easting | Northing | Area (ha) |
|---|---|---|---|---|---|---|
| 18 | 3 | 788500 | 6992400 | 789500 | 6992500 | 10 |
| 19 | 3 | 789500 | 6992400 | 790500 | 6992500 | 10 |
| 20 | 3 | 788500 | 6992500 | 789500 | 6992600 | 10 |
| 21 | 3 | 789500 | 6992500 | 790500 | 6992600 | 10 |
| 22 | 3 | 788500 | 6992600 | 789500 | 6992750 | 15 |
| 23 | 3 | 789500 | 6992600 | 790500 | 6992700 | 10 |
| 24 | 5 | 788500 | 6992750 | 789500 | 6992900 | 15 |
| 25 | 5 | 789500 | 6992700 | 790500 | 6992850 | 15 |
| 26 | 5 | 789500 | 6992850 | 790500 | 6993000 | 15 |
| 27 | 5 | 786900 | 6994150 | 787050 | 6994700 | 15 |
| 28 | 5 | 787050 | 6994700 | 788050 | 6994850 | 15 |
| 29 | 5 | 787000 | 6994850 | 788000 | 6995000 | 15 |
| 30 | 5 | 787050 | 6994850 | 787200 | 6994150 | 15 |
| 31 | 3 | 783500 | 6996650 | 783600 | 6997650 | 10 |
| 32 | 3 | 783400 | 6996640 | 783500 | 6997650 | 10 |
| 33 | 3 | 782870 | 6998400 | 783970 | 6998500 | 10 |
| 34 | 3 | 782870 | 6998500 | 783970 | 6998600 | 10 |
| 35 | 3 | 784000 | 7000600 | 784100 | 7001700 | 10 |
| 36 | 3 | 783900 | 7000600 | 784000 | 7001700 | 10 |
| 37 | 3 | 786100 | 6996375 | 786200 | 6997375 | 10 |
| 38 | 3 | 786200 | 6996375 | 786300 | 6997375 | 10 |
| 39 | 3 | 792100 | 6991100 | 792200 | 6991200 | 10 |
| 40 | 3 | 792200 | 6991100 | 792300 | 6991200 | 10 |
| 41 | 3 | 792100 | 6985740 | 792200 | 6986740 | 10 |
| 42 | 3 | 792200 | 6985740 | 792300 | 6986740 | 10 |
| 43 | 3 | 206400 | 6981100 | 206500 | 6982100 | 10 |
| 44 | 3 | 206500 | 6981100 | 206600 | 6982100 | 10 |
| 45 | 3 | 778800 | 7002575 | 778900 | 7003575 | 10 |
| 46 | 3 | 778900 | 7002575 | 779000 | 7003575 | 10 |
| 47 | 3 | 784800 | 6992200 | 785800 | 6992300 | 10 |
| 48 | 3 | 785800 | 6992200 | 786800 | 6992300 | 10 |
| 49 | 3 | 784800 | 6992300 | 785800 | 6992400 | 10 |
| 50 | 3 | 785800 | 6992300 | 786800 | 6992400 | 10 |
| 51 | 3 | 782150 | 6993900 | 782750 | 6994000 | 6 |
| 52 | 3 | 796500 | 6989650 | 796600 | 6990650 | 10 |
| 53 | 3 | 796600 | 6989650 | 796700 | 6990650 | 10 |
| 54 | 3 | 796500 | 6990650 | 796600 | 6991650 | 10 |
| 55 | 3 | 796600 | 6990650 | 796700 | 6991650 | 10 |
| 56 | 3 | 793700 | 6996550 | 793800 | 6997950 | 14 |
| 57 | 3 | 793500 | 6996550 | 793600 | 6997950 | 14 |
| 58 | 3 | 793900 | 6996550 | 794000 | 6997950 | 14 |
| 59 | 3 | 794100 | 6996550 | 794200 | 6997950 | 14 |
| | | | | | **Total** | **842** |

**Appendix 7. Locations of conservation significant fauna recorded by BCE during the 2009 and 2010 surveys (Tables A-B).**

**Table A. Records of captures and observations**

| Species | Status | Location (Zone) | Easting | Northing | Habitat | Comments |
|---|---|---|---|---|---|---|
| Bush Stone-curlew | CS2 | Fauna Site 8. (50J) | 782753 | 6994305 | Calcrete woodland | One responded to call playback |
| Bush Stone-curlew | CS2 | Gnamma Hole. (50J). | 782368 | 6992519 | Hardpan Mulga | One heard |
| Bush Stone-curlew | CS2 | Gnamma Hole. (51J). | 246094 | 6986988 | Waterhole at Breakaway | Tracks |
| Bush Stone-curlew | CS2 | South-west of Deposit | 782251 | 6993793 | Hardpan Mulga | |
| Australian Bustard | CS2 | west of resource (50J) | 762547 | 7009055 | Sand Dune | One |
| Australian Bustard | CS2 | Throughout study area | | | All | Tracks found throughout |
| Peregrine Falcon | CS1 | Barr Smith Range. (51J) | 250609 | 6975588 | Granite Breakaway | One |
| Malleefowl (mound) (Profile 1, 3m wide) | CS1 | North of Deposit. (50J) | 790511 | 6992350 | Closed Acacia over Spinifex sandplain. Unburnt Acacia. | Inactive mound: constructed over old track, egg shell fragments present, suggesting recent use, made of sand. |
| Rainbow Bee-eater | CS1 | Throughout study area, including the Project area | | | All | Probably breeding |
| Brush-tailed Mulgara | CS2 | Camera trap site (51J) | 206575 | 6981657 | Spinifex Sandplain | Individual recorded on camera trap |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10: (50J) | 783175 | 6999647 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |

| Species | Status | Location (Zone) | Easting | Northing | Habitat | Comments |
|---|---|---|---|---|---|---|
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 783126 | 6999656 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 783087 | 6999650 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 783054 | 6999647 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 10. (50J) | 782901 | 6999612 | Spinifex Sandplain | Individual trapped |
| Brush-tailed Mulgara | CS2 | Fauna Site 6. (50J). | 782931 | 6989858 | Spinifex with Open Mulga Shrubland | Individual trapped |
| Black-flanked Rock-Wallaby | CS1 | Barr Smith Range. (51J) | 247522 | 6984286 | Cave along breakaway | Large number of scats recorded in cave. |
| Greater Long-eared Bat | CS2 | Rubble Bore (50J) | 782841 | 6997710 | Mulga Woodland | Anabat recording |

**Table B. Brush-tailed Mulgara records based on burrows, foraging signs, tracks and/or scats. This tabulates the results of records from the Mulgara transects conducted throughout the study area.**

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 1 | 5/11/09 | North of Deposit | 790509 | 6992878 | burrow | 1 | | | Active | |
| Mul 1 | 5/11/09 | North of Deposit | 790500 | 6992634 | burrow | 1 | | | Inactive | debris in burrow |
| Mul 1 | 5/11/09 | North of Deposit | 790495 | 6992492 | burrow | 1 | yes | | Active | fresh tracks |
| Mul 1 | 5/11/09 | North of Deposit | 790527 | 6992271 | burrow | 1 | yes | | Active | |
| Opp | 5/11/09 | North of Deposit | 790211 | 6992417 | burrow | 1 | | | Active | fresh spoil in burrow |
| Mul 2 | 6/11/09 | North of Deposit | 789086 | 6993273 | burrow | 1 | | | Inactive | old |
| Mul 3 | 6/11/09 | Site 3 | 782921 | 6989846 | burrow | 1 | | yes | Active | |
| Mul 3 | 6/11/09 | Site 3 | 783139 | 6989708 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 782984 | 6999620 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783003 | 6999631 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783017 | 6999617 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783022 | 6999604 | burrow | 6 | yes | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783112 | 6999630 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783184 | 6999608 | burrow | 3 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783196 | 6999619 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783450 | 6999635 | feeding sign | 1 | | | | |
| Mul 4 | 6/11/09 | Site 10 | 783459 | 6999631 | feeding sign | 1 | | | | |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 4 | 6/11/09 | Site 10 | 783550 | 6999626 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783641 | 6999609 | burrow | 1 | yes | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783654 | 6999610 | burrow | 3 | yes | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783864 | 6999624 | burrow | 2 | | yes | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783644 | 6999518 | burrow | 3 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783637 | 6999518 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783483 | 6999527 | burrow | 3 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783139 | 6999524 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783050 | 6999517 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 782908 | 6999524 | burrow | 1 | | | Inactive | |
| Mul 6 | 9/11/09 | Meeka Rd 1 | 795275 | 6989460 | burrow | 3 | | | Inactive | Habitat altered by fire |
| Mul 7 | 9/11/09 | Meeka Rd 2 | 204670 | 6986499 | burrow | 1 | | | Inactive | |
| Mul 7 | 9/11/09 | Meeka Rd 2 | 204437 | 6986423 | burrow | 1 | | | Inactive | |
| Mul 7 | 9/11/09 | Meeka Rd 2 | 204347 | 6986589 | burrow | 1 | yes | yes | Active | |
| Mul 1 | 5/11/09 | North of Deposit | 790112 | 6992500 | burrow | 1 | | | inactive | |
| Mul 1 | 5/11/09 | North of Deposit | 790552 | 6992390 | burrow | 1 | | | inactive | |
| Mul 3 | 7/11/09 | Transect 6 | 783285 | 6989659 | burrow | 8 | | | inactive | |
| Mul 3 | 7/11/09 | Transect 6 | 782969 | 6989660 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 782976 | 6999607 | burrow | 1 | | | active | |
| Mul 4 | 7/11/09 | Transect 10 | 782998 | 6999600 | burrow | 3 | | yes | active | |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 4 | 7/11/09 | Transect 10 | 783028 | 6999605 | burrow | 1 | | | active | |
| Mul 4 | 7/11/09 | Transect 10 | 783157 | 6999597 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783191 | 6999605 | burrow | 2 | yes | | active | |
| Mul 4 | 7/11/09 | Transect 10 | 783202 | 6999611 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783214 | 6999597 | burrow | 3 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783606 | 6999600 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783883 | 6999594 | burrow | 2 | | | active | |
| Mul 4 | 7/11/09 | Transect 10 | 783847 | 6999494 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783696 | 6999496 | burrow | 8 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783620 | 6999496 | burrow | 1 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 783459 | 6999512 | burrow | 1 | | yes | active | |
| Mul 4 | 7/11/09 | Transect 10 | 783051 | 6999510 | burrow | 12 | | | inactive | |
| Mul 4 | 7/11/09 | Transect 10 | 782986 | 6999527 | burrow | 8 | | | active | |
| Mul 8 | 9/11/09 | | 211162 | 6983755 | burrow | 2 | | | inactive | |
| Mul 8 | 9/11/09 | | 211156 | 6984636 | burrow | 1 | | | inactive | |
| Mul 3 | 7/11/09 | Site 6 | 782790 | 6989632 | burrow | 1 | | | Active | |
| Mul 4 | 7/11/09 | Site 10 | 782921 | 6999559 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 782949 | 6999556 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 782966 | 6999555 | burrow | 2 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783002 | 6999570 | forage | | | | | |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 4 | 7/11/09 | Site 10 | 783026 | 6999559 | forage | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783039 | 6999552 | burrow | 1 | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783046 | 6999563 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783088 | 6999550 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783111 | 6999552 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783178 | 6999557 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783251 | 6999554 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783290 | 6999560 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783312 | 6999566 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783331 | 6999568 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783379 | 6999566 | burrow | 5 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783483 | 6999562 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783565 | 6999563 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783612 | 6999552 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783610 | 6999560 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783678 | 6999562 | burrow | 1 | | | Active | |
| Mul 4 | 7/11/09 | Site 10 | 783699 | 6999559 | burrow | 1 | | yes | Active | |
| Mul 4 | 7/11/09 | Site 10 | 783820 | 6999551 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783846 | 6999547 | burrow | 10 | | yes | Active | |
| Mul 4 | 7/11/09 | Site 10 | 783855 | 6999555 | forage | | | | | |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 4 | 7/11/09 | Site 10 | 783846 | 6999455 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783838 | 6999449 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783823 | 6999443 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783817 | 6999448 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783811 | 6999443 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783803 | 6999450 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783745 | 6999470 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783574 | 6999462 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783351 | 6999464 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783143 | 6999466 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783102 | 6999458 | forage | | | | | |
| Mul 4 | 7/11/09 | Site 10 | 783073 | 6999460 | burrow | 1 | | | Inactive | |
| Mul 4 | 7/11/09 | Site 10 | 783002 | 6999459 | burrow | 1 | | | Inactive | |
| Mul 8 | 9/11/09 | Airfield Rd | 211181 | 6983654 | forage | | | | | |
| Mul 8 | 9/11/09 | Airfield Rd | 211167 | 6983780 | forage | | | | | |
| Mul 8 | 9/11/09 | Airfield Rd | 211114 | 6983720 | burrow | 1 | | | Inactive | |
| Mul 8 | 9/11/09 | Airfield Rd | 211086 | 6983708 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783025 | 6999591 | burrow | 3 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783174 | 6999585 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783266 | 6999583 | burrow | 2 | | | Active | |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Mul 4 | 6/11/09 | Site 10 | 783312 | 6999586 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783418 | 6999584 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783814 | 6999577 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783873 | 6999572 | burrow | 1 | yes | yes | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783822 | 6999474 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783673 | 6999472 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783608 | 6999478 | burrow | 1 | | | Active | |
| Mul 4 | 6/11/09 | Site 10 | 783162 | 6999479 | burrow | 1 | | | Inactive | |
| Mul 4 | 6/11/09 | Site 10 | 783017 | 6999484 | burrow | 1 | | | Active | |
| Mul 7 | 9/11/09 | Meeka Rd 2 | 204365 | 6986682 | burrow | 1 | | | Active | active burrow system |
| **MAY 2010** | | | | | | | | | | |
| 1 | 5/05/2010 | Zone 50J | 790 050 | 6 991 556 | foraging hole | | | | | foraging holes |
| 1 | 5/05/2010 | Zone 50J | 790 480 | 6 991 515 | foraging holes | | | | | foraging holes |
| 2 | 5/05/2010 | Zone 50J | 789 930 | 6 991 626 | foraging holes | | | | | foraging holes |
| 9 | 6/05/2010 | Zone 50J | 789 537 | 6 992 020 | tracks | | yes | | | tracks |
| 12 | 6/05/2010 | Zone 50J | 789 280 | 6 992 115 | tracks | | yes | | | tracks |
| 14 | 6/05/2010 | Zone 50J | 789 450 | 6 992 224 | tracks | | yes | | | tracks |
| 14 | 6/05/2010 | Zone 50J | 789 300 | 6 992 210 | Burrow | | | | inactive | Burrow system |
| 16 | 6/05/2010 | Zone 50J | 788 823 | 6 992 322 | Burrow | | | | inactive | 2 inactive burrows |
| 19 | 6/05/2010 | Zone 50J | 790 500 | 6 992 400 | Burrow | | | | inactive | 2 inactive burrows |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 6/05/2010 | Zone 50J | 790 450 | 6 992 430 | Burrow | | | | inactive | 1 inactive burrow |
| 19 | 6/05/2010 | Zone 50J | 790 341 | 6 992 429 | Burrow | | | | inactive | 1 inactive burrow |
| 19 | 6/05/2010 | Zone 50J | 790 260 | 6 992 416 | Burrow | | | | inactive | 1 inactive burrow |
| 19 | 6/05/2010 | Zone 50J | 790 208 | 6 992 420 | Burrow | | | | inactive | 1 inactive burrow |
| 21 | 6/05/2010 | Zone 50J | 790 249 | 6 992 522 | Burrow | | yes | | active | active burrow |
| 21 | 6/05/2010 | Zone 50J | 790 288 | 6 992 533 | Burrow | | | | inactive | 1 inactive burrow |
| 21 | 6/05/2010 | Zone 50J | 790 408 | 6 992 526 | Burrow | | | | inactive | 1 inactive burrow |
| 25 | 7/05/2010 | Zone 50J | 790 140 | 6 992 722 | foraging | | | | | 1 foraging hole |
| 25 | 7/05/2010 | Zone 50J | 790 196 | 6 992 742 | foraging | | | | | 1 foraging hole |
| 26 | 7/05/2010 | Zone 50J | 790 099 | 6 992 898 | foraging | | | | | 1 foraging hole |
| 31 | 7/05/2010 | Zone 50J | 783 515 | 6 997 477 | foraging | | | | | 2 foraging holes |
| 31 | 7/05/2010 | Zone 50J | 783 511 | 6 997 377 | Burrow | | yes | | active | warren of 5 holes |
| 32 | 7/05/2010 | Zone 50J | 783 482 | 6 997 406 | Foraging | | | | | 2 old foraging holes |
| 33 | 7/05/2010 | Zone 50J | 783 330 | 6 998 417 | Foraging | | | | | old foraging hole |
| 33 | 7/05/2010 | Zone 50J | 783 650 | 6 998 417 | foraging | | | | | old foraging hole |
| 33 | 7/05/2010 | Zone 50J | 783 768 | 6 998 422 | foraging | | | | | old foraging hole |
| 34 | 7/05/2010 | Zone 50J | 783 871 | 6 998 521 | Burrow | | yes | yes | active | Active burrow |
| 34 | 7/05/2010 | Zone 50J | 783 625 | 6 998 520 | Burrow | | | | inactive | inactive burrow |
| 34 | 7/05/2010 | Zone 50J | 783 376 | 6 998 522 | Track | | | | | track |
| 34 | 7/05/2010 | Zone 50J | 783 190 | 6 998 530 | foraging | | | | | old foraging hole |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 7/05/2010 | Zone 50J | 783 108 | 6 998 521 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 019 | 7 001 513 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 013 | 7 001 493 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 014 | 7 001 437 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 013 | 7 001 122 | Burrow | | yes | | active | Active burrow |
| 35 | 8/05/2010 | Zone 50J | 784 014 | 7 001 005 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 012 | 7 000 946 | Burrow | | | | active | Active burrow |
| 35 | 8/05/2010 | Zone 50J | 784 011 | 7 000 671 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 098 | 7 000 715 | foraging | | | | | old foraging hole |
| 35 | 8/05/2010 | Zone 50J | 784 088 | 7 000 682 | tracks | | yes | | | Tracks |
| 35 | 8/05/2010 | Zone 50J | 784 081 | 7 000 601 | foraging | | | | | old foraging hole |
| 36 | 8/05/2010 | Zone 50J | 783 963 | 7 000 918 | foraging | | | | | old foraging hole |
| 36 | 8/05/2010 | Zone 50J | 784 000 | 7 000 993 | Burrow | | | | active | Active burrow |
| 36 | 8/05/2010 | Zone 50J | 783 990 | 7 001 028 | foraging | | | | | old foraging hole |
| 36 | 8/05/2010 | Zone 50J | 783 985 | 7 001 043 | Burrow | | | | active | Active burrow system |
| 36 | 8/05/2010 | Zone 50J | 783 985 | 7 001 289 | foraging | | | | | old foraging hole |
| 36 | 8/05/2010 | Zone 50J | 783 997 | 7 001 367 | Burrow | | | | active | Active burrow system |
| 37 | 8/05/2010 | Zone 50J | 788 124 | 7 996 841 | Burrow | | | | active | Active burrow |
| 38 | 8/05/2010 | Zone 50J | 786 225 | 7 996 379 | Burrow | | | yes | active | Active burrow |
| 38 | 8/05/2010 | Zone 50J | 786 218 | 7 997 215 | foraging | | | | | old foraging hole |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 8/05/2010 | Zone 50J | 792 238 | 6 991 923 | Burrow | | yes | | active | Active burrow in goanna digging with scats at entrance |
| 40 | 8/05/2010 | Zone 50J | 792 222 | 6 992 633 | Burrow | | yes | | active | Active burrow in goanna digging with scats at entrance |
| 40 | 8/05/2010 | Zone 50J | 792 230 | 6 992 668 | foraging | | | | | old foraging hole |
| 41 | 8/05/2010 | Zone 50J | 792 115 | 6 986 541 | Burrow | | | | inactive | old foraging burrow |
| 42 | 8/05/2010 | Zone 50J | 792 223 | 6 986 408 | Burrow | yes | | | active | Active burrow |
| 42 | 8/05/2010 | Zone 50J | 792 230 | 6 986 480 | track | | | | | Track |
| 43 | 8/05/2010 | Zone 51 | 206 435 | 6 981 616 | Burrow | | | | inactive | Burrow system |
| 43 | 8/05/2010 | Zone 51 | 206 411 | 6 981 425 | Burrow | | yes | | active | Active burrow in goanna digging with scats at entrance |
| 45 | 9/05/2010 | Zone 50J | 778 809 | 7 003 450 | Scat | | yes | | | Scat |
| 45 | 9/05/2010 | Zone 50J | 778 820 | 7 003 523 | Track | | | | | Track |
| 45 | 9/05/2010 | Zone 50J | 778 809 | 7 003 412 | foraging | | | | | recent foraging hole |
| 45 | 9/05/2010 | Zone 50J | 778 816 | 7 003 274 | Track | | | | | Track |
| 45 | 9/05/2010 | Zone 50J | 778 811 | 7 003 175 | Burrow | | | | active | Active burrow |
| 45 | 9/05/2010 | Zone 50J | 778 810 | 7 002 580 | track | | | | | Track |
| 46 | 9/05/2010 | Zone 50J | 778 923 | 7 002 747 | track | | | | | Track |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 9/05/2010 | Zone 50J | 778 917 | 7 002 833 | track | | | | | Track |
| 46 | 9/05/2010 | Zone 50J | 778 925 | 7 003 217 | foraging | | | | | recent foraging hole |
| | 6/05/2010 | Zone 50J | 789930 | 6991646 | Burrow | 2 | | | active | |
| | 6/05/2010 | Zone 50J | 789794 | 6991648 | Burrow | 1 | | | inactive | Old |
| | 6/05/2010 | Zone 50J | 789546 | 6991649 | Burrow | 1 | | | inactive | Old |
| | 6/05/2010 | Zone 50J | 789549 | 6991745 | Burrow | 1 | | | active | |
| | 6/05/2010 | Zone 50J | 790488 | 6992256 | Burrow | 1 | | | active | |
| | 7/05/2010 | Zone 50J | 790244 | 6992548 | Burrow | 1 | | | inactive | Old |
| | 7/05/2010 | Zone 50J | 783455 | 6996858 | Burrow | 1 | | | inactive | Old |
| | 7/05/2010 | Zone 50J | 783072 | 6998448 | Burrow | 1 | Yes | | active | Recent |
| | 7/05/2010 | Zone 50J | 783166 | 6998446 | Burrow | 1 | | | inactive | |
| | 7/05/2010 | Zone 50J | 783639 | 6998559 | Burrow | 1 | | | inactive | Old |
| | 8/05/2010 | Zone 50J | 784063 | 7000985 | Burrow | 1 | | | inactive | Old |
| | 8/05/2010 | Zone 50J | 784073 | 7000826 | Burrow | 1 | | Yes | active | Recent |
| | 8/05/2010 | Zone 50J | 783949 | 7000816 | Burrow | 1 | | | inactive | Old? |
| | 9/05/2010 | Zone 50J | 783959 | 7000944 | Burrow | 3 | | | active | |
| | 9/05/2010 | Zone 50J | 786149 | 6996854 | Burrow | 1 | | Yes | active | |
| | 9/05/2010 | Zone 50J | 786259 | 6996367 | Burrow | 1 | | | inactive | |
| | 6/05/2010 | 50J | 789680 | 6991591 | Burrow | 4 | yes | | active | active burrow system |
| | 6/05/2010 | 50J | 789159 | 6991979 | Burrow | 4 | | | inactive | inactive burrow |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6/05/2010 | 50J | 788841 | 6992274 | Burrow | 1 | | | active | Active burrow |
| | 6/05/2010 | 50J | 790460 | 6992502 | Burrow | 1 | | | active | 1 active burrow |
| | 6/05/2010 | 50J | 790436 | 6992494 | Burrow | 3 | yes | yes | active | active burrow |
| | 6/05/2010 | 50J | 790224 | 6992570 | Burrow | 1 | | | active | 1 burrow |
| | 6/05/2010 | 50J | 783567 | 6996828 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 6/05/2010 | 50J | 783424 | 6996840 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 6/05/2010 | 50J | 783421 | 6997058 | Burrow | 1 | | | inactive | inactive burrow |
| | 6/05/2010 | 50J | 783507 | 6998492 | Burrow | 1 | | | inactive | 1 burrow with tracks |
| | 6/05/2010 | 50J | 783682 | 6998529 | Burrow | 2 | yes | | active | 1 active burrow |
| | 6/05/2010 | 50J | 783829 | 6998596 | Burrow | 5 | yes | | active | 1 active burrow |
| | 6/05/2010 | 50J | 783517 | 6998581 | Burrow | 1 | yes | | active | 1 active burrow |
| | 6/05/2010 | 50J | 783401 | 6998584 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 7/05/2010 | 50J | 783262 | 6998580 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 7/05/2010 | 50J | 784070 | 7001634 | Burrow | 1 | | | inactive | 1 old inactive burrow |
| | 7/05/2010 | 50J | 784088 | 7000995 | Burrow | 2 | yes | yes | active | 2 active burrows |
| | 7/05/2010 | 50J | 784097 | 7000879 | Burrow | 10 | yes | | active | 1 active burrow system |
| | 7/05/2010 | 50J | 784076 | 7000710 | Burrow | 2 | yes | yes | active | 1 active burrow |
| | 7/05/2010 | 50J | 783922 | 7001488 | Burrow | 1 | | | inactive | 1 old inactive burrow |
| | 8/05/2010 | 50J | 786200 | 6996533 | Burrow | 1 | | | inactive | 1 old inactive burrow |
| | 8/05/2010 | 50J | 786285 | 6996502 | Burrow | 3 | yes | yes | active | active burrow system, |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | scats at entrance to goanna hole |
| | 8/05/2010 | 50J | 786279 | 6996941 | Burrow | 1 | yes | yes | active | numerous fresh scats and tracks in burrow entrance -goanna hole, fresh tracks of both goanna and mulgara at burrow entrance |
| | 8/05/2010 | 50J | 786254 | 6997211 | Burrow | 3 | yes | | active | 1 active burrow |
| | 8/05/2010 | 50J | 792192 | 6992132 | Burrow | 1 | yes | | active | 1 active burrow |
| | 8/05/2010 | 50J | 792299 | 6992220 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 8/05/2010 | 50J | 792194 | 6985979 | Burrow | 1 | yes | yes | active | 1 active burrow with tracks scats , goanna hole |
| | 8/05/2010 | 50J | 792284 | 6986497 | Burrow | 1 | yes | | active | 1 active burrow |
| | 8/05/2010 | 51J | 206487 | 6981645 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 8/05/2010 | 51J | 206575 | 6981657 | Burrow | 10 | yes | yes | active | active warren with 10 plus entrances |
| | 9/05/2010 | 50J | 783913 | 7001257 | Burrow | 1 | yes | yes | active | 1 active burrow |
| | 9/05/2010 | 50J | 790498 | 6992382 | Digging | | | | | 1 fresh digging |
| | 9/05/2010 | 50J | 783922 | 7001412 | Digging | | | | | 1 fresh digging |

| Transect | Date | Location | Record Easting | Record Northing | Record Type | # burrows/ entrances | Tracks Present | Scats Present | Status | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9/05/2010 | 50J | 778895 | 7002896 | Tracks | | | | | fresh tracks |

## Appendix 8. Details of bat species recorded (Tables A – D)

### Table A. Details of bat call samples from Anabat detectors

| Species | pulses | Dur | Fmax | Fmin | Fpeak |
|---|---|---|---|---|---|
| **March 2009** | | | | | |
| Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris* | 12 | 9.4 (± 1.5) | 23.6 (± 0.9) | 19.2 (± 0.4) | 19.7 (± 0.5) |
| Gould's Wattled Bat *Chalinolobus gouldii* | 10 | 6.9 (± 1.9) | 52.2 (± 6.2) | 29.2 (± 1.2) | 29.9 (± 0.9) |
| Inland Greater Long-eared Bat *Nyctophilus major tor* | 19 | 5.5 (± 1.1) | 61.3 (± 6.9) | 42.6 (± 1.3) | 42.7 (± 2.4) |
| Inland Broad-nosed Bat *Scotorepens balstoni* | 14 | 5.0 (± 0.7) | 63.0 (± 11.7) | 35.0 (± 1.2) | 35.3 (± 0.5) |
| Inland Forest Bat *Vespadelus baverstocki* | 14 | 3.6 (± 0.7) | 64.0 (± 7.2) | 45.7 (± 1.1) | 46.6 (± 1.3) |
| Inland Cave Bat *Vespadelus finlaysoni* | 14 | 5.3 (± 1.4) | 61.4 (± 3.7) | 53.8 (± 0.4) | 52.6 (± 0.5) |
| Inland Freetail Bat *Mormopterus* aff. *planiceps* (sp. 3) | 14 | 11.0 (± 0.9) | 30.0 (± 2.4) | 26.0 (± 0.6) | 26.2 (± 0.5) |
| White-striped Freetail Bat *Austronomus australis* | 14 | 10.0 (± 3.5) | 23.4 (± 4.9) | 13.9 (± 0.1) | 13.4 (± 1.0) |
| **November 2009** | | | | | |
| Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris* | 11 | 8.8 (± 3.4) | 21.6 (± 4.5) | 18.4 (± 0.2) | 18.5 - 21.5 |
| Gould's Wattled Bat *Chalinolobus gouldii* | 13 | 8.6 (± 1.4) | 35.0 (± 1.6) | 30.2 (± 0.4) | 29.8 - 31.7 |
| Inland Broad-nosed Bat *Scotorepens balstoni* | 25 | 5.1 (± 1.2) | 59.4 (± 11.6) | 34.0 (± 0.8) | 32.7 - 36.2 |
| Inland Freetail Bat *Mormopterus aff. planiceps* (sp. 3) | 12 | 9.5 (± 1.1) | 26.9 (± 0.6) | 25.7 (± 0.5) | 25.6 - 27.5 |

**Table B. Location of species records, based on either call recordings (A) or captures (C) in March 2009.**

| Species | Yeelirrie Homestead | Afghan Well | Breakaway | Rubble Bore |
|---|---|---|---|---|
| Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris* | A | | | A |
| Gould's Wattled Bat *Chalinolobus gouldii* | C, A | A | | A |
| Lesser Long-eared Bat *Nyctophilus geoffroyi* | C | | | |
| Inland Greater Long-eared Bat *Nyctophilus major tor* | | | | A? |
| Inland Broad-nosed Bat *Scotorepens balstoni* | C, A | | A | A |
| Inland Forest Bat *Vespadelus baverstocki* | | | | A |
| Inland Cave Bat *Vespadelus finlaysoni* | | A | A | |
| Inland Freetail Bat *Mormopterus* aff. *planiceps* (sp. 3) | C, A | A | A | A |
| White-striped Freetail Bat *Australonomus australis* | A | A | | |

**Table C. Location of species records, based on call recordings (A), captures (C) or heard (H) in November 2009.**

| Species | Yeelirrie Homestead | Fauna Site 1 | Gnamma Hole | Harp trap Site (Mulga woodland) | Corner near Fauna Site 11 |
|---|---|---|---|---|---|
| Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris* | | A | | | |
| Gould's Wattled Bat *Chalinolobus gouldii* | A | A | A | A | A |
| Lesser Long-eared Bat *Nyctophilus geoffroyi* | | | | C | |
| Inland Broad-nosed Bat *Scotorepens balstoni* | A | A | | A | A |
| Inland Freetail Bat *Mormopterus* aff. *planiceps* (sp. 3) | A | | A | A | A |
| White-striped Freetail Bat *Tadarida australis* | H | H | H | | H |

**Table D. Details of bats caught at Yeelirrie, in 2-bank Harp trap (March 2009) and 3-bank Harp trap (November 2009)**

FA= Forearm measurement (mm)

| Date | Location | Species | Sex | FA (mm) |
|---|---|---|---|---|
| 24/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♂ | |
| 25/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♂ | |
| 25/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♀ | |
| 28/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♂ | 42.3 |
| 29/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♂ | 40.6 |
| 29/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♂ | 32.2 |
| 29/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♀ | 35.1 |
| 29/3/09 | Yeelirrie HSD | *Scotorepens balstoni* | ♂ | 36.2 |
| 29/3/09 | Yeelirrie HSD | *Mormopterus* aff. *planiceps* (sp. 3) | ♂ | 34.1 |
| 30/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♂ | 41.7 |
| 30/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♂ | 40.9 |
| 30/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♂ | 42.1 |
| 30/3/09 | Yeelirrie HSD | *Chalinolobus gouldii* | ♀ | 41.1 |
| 30/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♀ | 34.2 |
| 30/3/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♂ | 33.4 |
| 7/11/09 | Yeelirrie HSD | *Nyctophilus geoffroyi* | ♂ | |
| 8/11/09 | Gnamma | *Nyctophilus geoffroyi* | ♂ | |

**Appendix 9. Rock Wallaby Scat Analysis**

Georgeanna Story

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22nd October 2009
Jeff Turpin
3 Hellenic Rd
Roleystone WA 6111

To Jeff Turpin

Re: Herbivore Scats

The herbivore scats found within a cave near Wilnuna demonstrate characteristics consistent with typical features found in rock-wallaby scats. Rock-wallaby scats possess a cylindrical shape with a pinch at one end and are generally smaller than 35mm. A single hair was extracted from the unknown sample and displayed features similar to rock-wallaby hair, however in this case the single hair is not enough to provide a definite identification.

Potential herbivores at the site are *Petrogale lateralis*, *P. rothschildii*, *Macropod robustus* and *Capra hircus*. *C. hircus* can be ruled out with a size and shape significantly different to the unknown sample. It is also unlikely that the scats were from *M. robustus*. On occasion a scat from *M. robustus* may display a cylindrical shape consistent with rock-wallaby scats, however a shape more characteristic for *M.*

*robustus* is of a squarer nature. The dominant shape within a single deposition is square for *M. robustus* and pinched cylindrical for rock-wallabies. The consistency of shape in the unknown sample is pinched cylindrical. Attached are photos of the unknown sample (Figure 1), *P. xanthopus* (Figure 2), *P. rothschildi* (Figure 3) and *M. robustus* (Figure 4) for your consideration.

Using the above information, I feel that the unknown sample is most likely to be rock-wallaby scats. Unfortunately the similarities in rock-wallaby scats and hair have limited the ability for further identification.

Yours faithfully

Georgeanna Story


Figure 1. Unknown scats from Yeelirrie (identified as most likely a rock-wallaby)


Figure 2. *Petrogale xanthopsus* scats


Figure 3. *Petrogale rothschildi* scats


Figure 4. *Macropus robustus* scats