

MOUNT GIBSON MINING LIMITED

**FAUNA ASSESSMENT
MOUNT GIBSON**

VERSION 5

DECEMBER 2005

REPORT NO: 2004/51



DISCLAIMER

This document is published in accordance with and subject to an agreement between ATA Environmental (“ATA”) and the client for whom it has been prepared Mount Gibson Iron Limited (“Client”) and is restricted to those issues that have been raised by the client in its engagement of ATA and prepared using the standard of skill and care ordinarily exercised by Environmental Scientists in the preparation of such Documents.

Any person or organisation that relies on or uses the document for purposes or reasons other than those agreed by ATA and the Client without first obtaining the prior written consent of ATA, does so entirely at their own risk and ATA denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be suffered as a consequence of relying on this Document for any purpose other than that agreed with the Client.

QUALITY ASSURANCE

ATA Environmental has implemented a comprehensive range of quality control measures on all aspects of the company’s operation and has Quality Assurance certification to ISO 9001.

An internal quality review process has been applied to each project task undertaken by us. Each document is carefully reviewed by core members of the consultancy team and signed off at Director level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Document No: MGM-2004-002-FAU_008_st_V5

Report No: 2004/51



Checked by: Signed:

Name: Scott Thompson Date: 16 December 2005

Approved by: Signed:



Name: Martine Scheltema Date: 16 December 2005

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	1
1. INTRODUCTION.....	3
1.1 Purpose and Scope.....	3
1.2 Bioregional Assessment	4
1.3 Site Description	4
2. METHODOLOGY.....	5
2.1 Database Searches	5
2.2 Trapping	5
2.3 Avifauna Surveys	7
2.4 Spot-lighting Survey.....	8
2.5 Hand Searches and Opportunistic Investigations.....	8
2.6 Invertebrates	9
2.7 Survey Staff.....	9
2.8 Regional Data.....	9
2.9 Limitations.....	10
3. RESULTS	14
3.1 Avifauna.....	14
3.2 Reptiles.....	14
3.3 Amphibians	14
3.4 Mammals.....	15
3.5 Introduced Species	15
3.6 Invertebrates	15
3.7 Significant Vertebrate Species Recorded or Listed as Potentially Occurring in the Mount Gibson Area	15
3.8 Significant Fauna Recorded from the Study Area.....	17
3.8.1 Malleefowl	17
3.8.2 Other Significant Species Recorded.....	18
3.9 Descriptions of Threatened or Priority Species Under <i>WA Wildlife Conservation Act 1950-1979</i> That Were Listed as Being Potentially Found in the Mount Gibson Region	19
3.9.1 Schedule 1 – Fauna Which are Rare or Likely to Become Extinct.....	19
3.9.2 Schedule 4 - Fauna that are in Need of Special Protection.....	19
3.9.3 Priority 4 - Taxa in Need of Monitoring.....	20
3.10 Trap Type and Survey Effort Comparison	20
4. DISCUSSION	23
4.1 Other Studies	23
4.2 Assemblages with Ecological Significance.....	24

5. CONCLUSION AND RECOMMENDATIONS.....26

REFERENCES.....29

LIST OF FIGURES

1. Regional Location
2. Location of Trapping Sites and Hand Search Areas
3. Location of Malleefowl Mounds and Malleefowl

LIST OF PLATES

1. Pit-trap Drift Fence Showing a 20L Bucket Pit-trap and Pair of Funnel Traps
2. Averaged Species Accumulation Curve for Reptiles

LIST OF APPENDICES

1. Results of the CALM Fauna Database Search and Fauna Licence
2. Species of Birds Predicted to Occur and Recorded by ATA Environmental and Various Other Surveys in the Region
3. Bird Species Recorded in Different Habitats at Mount Gibson by ATA Environmental
4. Species of Reptile Predicted to Occur and Recorded at Mount Gibson for each Trapping Site
5. Species of Mammal Predicted to Occur and Recorded at Mount Gibson for each Trapping Site
6. Reptile and Amphibian Species Predicted to Occur and Recorded During ATA Environmental's March 2004 Survey and Other Surveys in the Region
7. Mammal Species Predicted to Occur and Recorded During ATA Environmental's March 2004 Survey and Other Surveys in the Region
8. Definitions of Significant Fauna under the *WA Wildlife Conservation Act 1950*

EXECUTIVE SUMMARY

ATA Environmental was commissioned by Mount Gibson Mining Limited to undertake a fauna survey and prepare a report to support the Environmental Impact Assessment for the proposed development.

The fauna assessment involved searches of the Western Australian Museum's *Faunabase*, the Department of Conservation and Land Management's Threatened and Priority Species database, the Commonwealth's *EPBC Act 1999* database; and an eight day trapping program supplemented by an avifauna survey, night spotlighting, hand searches and opportunistic sightings. These data were compared with the results of a previous fauna survey undertaken at the site (Hart, Simpson and Associates, 2000), long-term bird survey work done in the area by Emeritus Professor Harry Recher and multiple surveys undertaken in the region. Recommendations on measures to prevent or minimise impacts on significant fauna are made.

Qualified zoologists Dr Scott Thompson, Chris Clemente, Alexander Watson, and Cale Alexander conducted the fauna survey with assistance from Thomas Rasmussen.

The search of on-line databases and fauna surveying in similar habitats suggests that 8 species of amphibian, 69 species of reptile, 33 species of mammal (8 introduced or feral) and 163 bird species may be present in the general area. However, the specific habitat at Mount Gibson is such that the number of species in any one of these groups is likely to be appreciably less.

The fauna survey of the Mount Gibson area caught or sighted 358 individual reptiles and mammals, representing 112 species [64 species of birds, 38 species of reptiles and 10 species of mammals (five introduced)].

Malleefowl are present in the area, and it is highly probable that the area supports a breeding population. The presence of the Malleefowl will require a referral to the Department of Environment and Heritage under the *EPBC Act* if the proposed clearing could possibly have a significant impact on these species. Minesite planning should minimise any impacts on Malleefowl and provide adequate buffer zones and foraging areas for these birds and the Fauna Management Plan should incorporate a Malleefowl Conservation Strategy.

Although the Rainbow Bee-eater (a Migratory species listed under the *EPBC Act 1999*) was observed in the study area, it is unlikely that development activity associated with the mine will appreciably modify, destroy or isolate an area of important habitat, or seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population. The habitat utilised by Rainbow Bee-eaters is commonly found in the Mid-west region and the impact of disturbance at Mount Gibson will be minor as there are extensive areas of similar and suitable habitat for the Rainbow Bee-eater in the area adjacent to the proposed Mt Gibson mine site.

Major Mitchell's Cockatoo (*Cacatua leadbeateri*; A threatened species under the *WA Wildlife Conservation Act 1950*) was previously seen at Mount Gibson by Hart, Simpson and Associates (2000) and Emeritus Professor Harry Recher. The habitats

utilised by this Cockatoo are widespread in the surrounding area and the sites that will be impacted upon during the mining development are small in comparison to the surrounding habitat. The impacts associated with further disturbances at each of these sites will have a low impact on Major Mitchell's Cockatoo.

It is highly unlikely that other specially protected or vulnerable species listed under the *EPBC Act 1999* or *WA Wildlife Conservation Act 1950*, such as *Aspildites ramsayi*, *Egernia stokesii badia* and *Cyclodomorphus branchialis*, are present in the vicinity of where the mine and associated infrastructure will be located.

The sandplain habitats surrounding the ironstone range found at Mount Gibson are similar to the surrounding area and the sites that will be impacted upon during the mining development at Mount Gibson are small in comparison to the surrounding habitat. The five species of agamids, seven species of elapids, 10 species of geckoes, three species of legless lizards, 13 species of skinks and four species of goanna are typical of the reptile assemblage encountered in most arid and semi-arid areas in Australia. Other than those species mentioned above, none of the reptile species caught are considered rare or are disjunction populations or requiring special protection. The composition of the small mammal assemblages is also what would be expected of a semi-arid habitat with none of the species caught representing disjunct populations or requiring special protection.

Bird observations by ATA Environmental in March 2004 are similar to the records by Hart, Simpson and Associates and Emeritus Professor Harry Recher for Mt Gibson, and are also similar to bird assemblages recorded by Recher in the surrounding area. This suggests that the disturbance impact associated with the proposed mine at Mount Gibson will not be significant in a regional context, as similar bird assemblages and habitat are found in nearby areas. ATA Environmental therefore contends the proposed mine will have a minimal impact on other vertebrate species in the area, other than for those few species described above.

1. INTRODUCTION

Mount Gibson Mining proposes to mine iron ore for export overseas.

ATA Environmental was commissioned by Mount Gibson Mining Limited to undertake a fauna survey and prepare an associated report to support the Environmental Impact Assessment (EIA) for the proposed development.

1.1 Purpose and Scope

The fauna survey was undertaken before the EPA's Guidance for the Assessment of Environmental Factors No 56: Terrestrial Surveys for Environmental Impact Assessment (June 2004) was released. The scope of works is therefore based on material provided in EPA's Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (March 2002). This Position Statement requires a Level 2 fauna assessment for developments with impacts that are assessed as either 'moderate' or 'high' in the bioregion of the proposed mine. A Level 2 assessment involves a comprehensive fauna survey in addition to a desktop study. Environmental variables that contribute to 'moderate' or 'high' impacts are the size of the area (e.g. 1-10ha is moderate, and > 10ha is high), potential for rare or range restricted fauna in the area, whether the area contains habitat of ecological or conservation significance, whether the area serves as an ecological refuge for fauna species or the area supports populations of statutory protected species (e.g. those listed under JAMBA/CAMBA treaties).

This report includes:

- a review of the Western Australian Museum (*FaunaBase*) on-line database to identify potential vertebrate fauna within the area;
- a search of the Department of Conservation and Land Management's Threatened and Priority Species database to identify potential scheduled and threatened species within the region;
- a search of the Commonwealth's on-line database to identify fauna species of national environmental significance that are protected under the *Environment Protection and Biodiversity Conservation Act 1999* potentially occurring within the area;
- results of an eight day trapping program, avifauna survey, spotlighting surveys, hand searches and opportunistic sightings;
- comparisons with the results of a previous fauna surveys and long-term bird survey undertaken in the area; and
- recommendations on measures to prevent or minimise impacts on any significant fauna.

1.2 Bioregional Assessment

Mt Gibson is located on a Crown Reserve, vacant crown land and a small portion of Ninghan Station.

Mt Gibson occurs on the boundary of the Austin Botanical District of the Eremaean and the Avon Botanical District of the Southwest Botanical Provinces (Beard, 1990). It is located in the Avon Wheatbelt bioregion (McKenzie *et al.*, 2003) however is near the junction of the Yalgoo and Coolgardie Interim Biogeographical Regional Assessment (IBRA) bioregions. The area has been recognised for its biological diversity (Vital Options Consulting, 2004).

The Avon Wheatbelt is an area of active drainage dissecting a Tertiary plateau in Yilgarn Craton (McKenzie *et al.*, 2003). Systematic fauna surveys of the region have not been conducted and are required for birds, small terrestrial mammals, reptiles and select invertebrate groups across the landscape (McKenzie *et al.*, 2003).

The adjoining properties are managed for conservation purposes. The Australian Wildlife Conservancy (AWC) manages the Mt Gibson pastoral lease with the emphasis on habitat recovery for fauna reintroduction. White Wells Station (now named Charles Darwin Reserve) is managed by the Australian Bush Heritage Fund (ABHF). The Ninghan pastoral lease is owned by the Pindiddy Aboriginal Corporation (PAC). A portion of Ninghan Station has been identified as an Indigenous Protection Area (IPA) with the management objective for the IPA area being income based on conservation activities rather than pastoral activities. CALM has also purchased a number of stations in the general vicinity including Kadji Kadji, Karara, Lochada and Warriedar Stations to meet the criteria for a comprehensive, adequate and representative reserve system.

1.3 Site Description

Mount Gibson has a diverse vegetation community comprising of six woodlands, four mallee communities, 12 thicket communities and two heath communities (Bennett Environmental Consulting, 2000). None of these communities are considered rare or restricted. The peaks of the Mount Gibson Range have different vegetation communities, with *Acacia* species, *Melaleuca* species and *Allocasuarina acutivalvis* subsp. *prinsepiana* being the dominant taxa. The woodland plains typically consisted of *Eucalyptus loxophleba* subsp. *supralaervis* or mallees of *E. brachycorys* and *E. hypochlamydea* subsp. *hypochlamydea*, which are often associated with *Callitris glaucophylla* and *Eucalyptus loxophleba* subsp. *supralaervis*. On the edge of the Great Northern Highway there was an extensive area of sandplain which exhibited a varied flora (Bennett Environmental Consulting, 2000).

From a fauna perspective, the habitat can be divided into four broad categories; the flat sandplains, the flat woodlands, slopes and the iron stone ridges. Each of the major habitat types have been surveyed for this assessment and the methodology is provided below.

2. METHODOLOGY

2.1 Database Searches

A search of *FaunaBase* was undertaken to develop a list of birds, reptiles, mammals and amphibians likely to be in the project area. The search of *FaunaBase* was bounded by latitude 29° 00' to 30° 00'S and longitude 117° 50' to 118° 00'E. This wide search area was used, as there was not a lot of data in *FaunaBase* for the specific study area and the habitats represented at the study site are similar to those in the quadrant described by the latitudes and longitudes selected. Data from *FaunaBase* were supplemented with information from Tyler *et al.* (2000) for frogs, Storr *et al.* (1983, 1986, 1990 and 1999) for reptiles, Johnstone and Storr (1998; 2004) for birds, Strahan (1995) for mammals and consultant staff's personal experience. Hart, Simpson and Associates conducted a survey in October 2000 (Hart, Simpson and Associates, 2000) and a research group a survey in August 2001 (Anon, 2001). These data have been incorporated into the analysis.

Emeritus Professor Harry Recher (formally of Edith Cowan University) has conducted bird surveys at Mount Gibson since August 2000. His bird survey data assisted with the preparation of an expected bird species list for the region and provided comparison with our observations during the 2004 survey.

A search of the Department of Conservation and Land Management's Threatened and Priority Species database and the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* on-line database was undertaken to identify potential Scheduled and Threatened species in the region.

These sources of information were used to create lists of species expected to occur at the site. Expected species are defined as those that are likely to utilise the project area. It should be noted that these lists often include species that have been recorded in the general region, but are vagrants, as suitable habitat is absent. Vagrants can be recorded almost anywhere. In addition, because *FaunaBase* is a historic record, it can include species that are now locally extinct. Many of the bird, mammal and reptile species have specific habitat requirements which may be present in the general area but not in the specific study area. Also, the ecology of many of these species is often not well understood and it can sometimes be difficult to indicate those species whose specific habitat requirements are not present in the project area. As a consequence some species will be included in the list produced from these database searches but will not be present in the actual study area.

Taxonomy and nomenclature for fauna species used in this report generally follow that provided in *FaunaBase* which we presume is based on Aplin and Smith (2001) for amphibians and reptiles, How *et al.* (2001) for mammals and Johnstone (2001) for birds.

2.2 Trapping

An eight day fauna trapping program was conducted at Mount Gibson from 8–16 March 2004. All fauna trapping was conducted under a licence issued by the

Department of Conservation and Land Management (CALM; # SF 004479; Appendix 1). Three reptiles and one mammal were vouchered with the Western Australian Museum to confirm identifications.

Eleven separate trapping sites were used to include all the major biotopes. Each trap site was set up within the vegetated portion of the Mount Gibson study area (Figure 2). Sites 2-10 consisted of five trapping arrays spaced 30 metres apart. Each trapping array consisted of one 150mm diameter stormwater pipe pit-trap (500mm deep), one 20L bucket pit-trap and four funnel traps [each is approximately 800mm long and has a capture area of 200mm * 200mm at either end, with a funnel entrance of 5cm (Plate 1)] alternating along a 10m drift fence which is 300mm high. Four cage traps and five Elliott traps were set in the vicinity of each pit-trap array. Site 1 had no 150mm pipe or 20L bucket pit-traps as the soil substrate was rock. However, funnel traps, cage traps and Elliott traps were used in a similar pattern to Sites 2-10. The trapping protocol used at Site 11 was similar to Sites 2-10, however, no cage traps were used.

There were three different habitat associations based on topography; flat, slope and ridge tops. Two sites were on ridge tops, one on the slope and eight on the flat ground. The location and a description of each trapping site is provided in Table 1 and shown in Figure 2. Five similar habitat types were identified at Mount Gibson.

TABLE 1
LOCATION AND DESCRIPTION OF TRAPPING SITES

	Location		Topography at Trap Site	Similar Habitats	Description of habitat at Trap site
Site 1	50 515553 E	6728276 N	Ridge Top	V	Dense thicket of mixed species dominated by <i>Acacia</i> species, <i>Allocasuarina acutivalvis</i> subsp. <i>prinsepiana</i> , <i>Calcopeplis paucifolius</i> and <i>Melaleuca nematophylla</i> over low shrublands in jaspillite rocks with pockets of loam.
Site 2	50 515739 E	6726861 N	Flat	I	Dense thicket of <i>Acacia</i> species, <i>Hakea</i> species, <i>Eucalyptus brachycorys</i> and <i>E. oldfieldii</i> with emergent <i>Calitris glaucophylla</i> , over open low shrublands of mixed species on sand.
Site 3	50 515678 E	6725962 N	Flat	I	Dense thicket of <i>Acacia assimilis</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>Prinsepiana</i> and <i>Melaleuca nematophylla</i> over low shrubland of <i>Hemigenia</i> sp. Paynes Find and <i>Hibbertia crassifolia</i> in loam pockets in jaspillite rocks.
Site 4	50 516913 E	6725196 N	Ridge Top	V	Dense thicket of <i>Acacia assimilis</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>prinsepiana</i> and <i>Melaleuca nematophylla</i> over low shrubland of <i>Hemigenia</i> sp. Paynes Find and <i>Hibbertia crassifolia</i> in loam pockets in jaspillite rocks.
Site 5	50 516473 E	6724992 N	Slope	I	Dense thicket of <i>Acacia assimilis</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>prinsepiana</i> and <i>Melaleuca nematophylla</i> over low shrubland of <i>Hemigenia</i> sp. Paynes Find and <i>Hibbertia crassifolia</i> in loam pockets in jaspillite rocks.
Site 6	50 517117 E	6724138 N	Flat	IV	Open tree mallee of <i>Eucalyptus brachycorys</i> , <i>E. hypochlamydea</i> subsp. <i>hypochlamydea</i> , <i>E. loxophleba</i> subsp. <i>Supralaevis</i> and <i>Callitris glaucophylla</i> over

	Location		Topography at Trap Site	Similar Habitats	Description of habitat at Trap site
					thicket of <i>Acacia</i> species over low shrubland and herbs on loam.
Site 7	50 518344 E	6724196 N	Flat	III	Dense low heath of <i>Halosarcia</i> species with other chenopods over herbs in sandy clay soil in a salt lake.
Site 8	50 518875 E	6725074 N	Flat	IV	Very open shrub mallee of <i>Eucalyptus leptopoda</i> with emergent <i>Eucalyptus loxophleba</i> subsp. <i>supralaervis</i> over thicket of <i>Acacia ramulosa</i> over herbland of <i>Asteraceae</i> species in loam.
Site 9	50 520106 E	6725505 N	Flat	II	Dense to open woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaervis</i> with occasional <i>Callitris glaucophylla</i> over a thicket of <i>Acacia</i> species dominated by <i>A. assimilis</i> over herbs dominated by <i>Velleia rosea</i> on silty sand.
Site 10	50 518089 E	6727685 N	Flat	I	Thicket of <i>Acacia</i> species and <i>Allocasuarina acutivalis</i> subsp. <i>prinsepiana</i> with emergent very open mallee of <i>Eucalyptus brachycorys</i> and <i>E. leptopoda</i> in loam.
Site 11	50 517197 E	6728968 N	Flat	II	Dense to open woodland of <i>Eucalyptus loxophleba</i> subsp. <i>supralaervis</i> with occasional <i>Callitris glaucophylla</i> over a thicket of <i>Acacia</i> species dominated by <i>A. assimilis</i> over herbs dominated by <i>Velleia rosea</i> on silty sand.

Table 2 shows the trapping effort for each site. Sites 9 and 10 were open for 8 nights, and all other sites were open for 7 nights. A total of 2983 trap nights were conducted between Monday 8 and Tuesday 16 March 2004.

TABLE 2
NUMBER OF TRAP NIGHTS PER TRAPPING SITE CONDUCTED AT MOUNT GIBSON

Site	Trap type			
	Pit-trap nights	Funnel Trap nights	Elliott trap nights	Cage trap nights
1	0	140	35	28
2	70	140	35	28
3	70	140	35	28
4	70	140	35	28
5	70	140	35	28
6	70	140	35	28
7	70	140	35	28
8	70	140	35	28
9	80	160	40	32
10	80	160	40	32
11	70	140	35	0
TOTAL	720	1580	395	288

2.3 Avifauna Surveys

Avifauna surveys were conducted each morning soon after sunrise, between Wednesday 9 and Monday 15 for two person hours by Alex Watson and opportunistically throughout the whole survey period (8-16 March) by all survey staff. All major tracks in the study area were walked, three long transects were conducted

east from the Mount Gibson Range to the boundary of the study area and 29 specific sites (shown in Figure 2) were investigated. Birds were identified by their call or direct observation. Estimates of bird abundance were given on each species within the study area (1-10, 10-100, 100+).

2.4 Spot-lighting Survey

Spot-lighting targets a particular suite of fauna, some of which are not readily caught by other means (e.g. pythons). It also enables observations of the large mammals that are often inactive during the day (e.g. kangaroos, cats, foxes, etc) or are nocturnal.

Spot-lighting was conducted from a slow moving vehicle (less than 8km/hr) using head torches and a two high powered hand-held spot lights on four evenings (10, 11, 13 and 14th March). In addition two people walked tracks in the area using head torches on four evenings (10, 11, 13 and 14th March). Each survey lasted approximately 2.5hrs and included each trapping site. The distance covered was approximately 15km in the vehicle and 3km by foot on each night of spot-lighting.

2.5 Hand Searches and Opportunistic Investigations

Hand searching identifies species that are often not caught in traps because of small activity areas, a wariness of traps, or an ability to escape from traps. Hand searching included digging out holes, removing bark from logs and trees, turning over rocks and sorting through leaf litter with rakes. One abandoned mine shaft was examined for bats.

Hand searching was conducted at each of the trapping sites for 5 person hours. In addition, 18 other sites were hand searched. The locations of these 'other sites' are shown in Table 3 and Figure 2.

Two areas were searched for Malleefowl (Figures 2 and 3). Five people walked in parallel through the bush searching for Malleefowl and Malleefowl mounds. The distance between each observer varied depending on vegetation density but ranged between 5 and 50m. Malleefowl mounds in open areas were easily located, however; those in dense vegetation are camouflaged and often difficult to see.

TABLE 3
LOCATION OF HAND SEARCHED SITES

	Location	
Site 12	50 520279 E	6723151 N
Site 13	50 514866 E	6728096 N
Site 14	50 515072 E	6728028 N
Site 15	50 519121 E	6726849 N
Site 16	50 518799 E	6726354 N
Site 17	50 518452 E	6726652 N
Site 18	50 517543 E	6726855 N
Site 19	50 518365 E	6725855 N
Site 20	50 518379 E	6723909 N

	Location	
Site 21	50 515824 E	6727818 N
Site 22	50 516199 E	6723880 N
Site 23	50 516895 E	6723642 N
Site 24	50 519025 E	6725623 N
Site 25	50 514040 E	6725120 N
Site 26	50 516856 E	6728589 N
Site 27	50 517402 E	6724534 N
Site 28	50 517476 E	6724358 N
Site 29	50 518506 E	6724848 N

As part of subsequent Malleefowl and short-range endemic invertebrate investigations, ATA Environmental opportunistically observed fauna between 20-24 September 2004, 13-21 January, 31 March – 2 April, 14-15 and 29-30 April, 9-13 May and 10-11 June 2005. Chain of custody details for incidental vertebrate captures vouchered with WAM during the short-range invertebrate investigations are provided in Appendix 10.

2.6 Invertebrates

Although most work focussed on vertebrate species, specimens of mygalomorph spiders, scorpions, centipedes, land snails and isopods were collected opportunistically and from pit-traps. These were targeted because within these groups, some species are known to have restricted distributions and the groups are therefore rich in short-range endemics, often associated with recital and fragmented habitats such as the ironstone ranges in the Murchison. In addition, the expertise exists to identify species within these groups, whereas, such expertise is not readily available for most other invertebrate taxa.

2.7 Survey Staff

Dr Scott Thompson (ATA Environmental), Chris Clemente, Alexander Watson, and Cale Alexander, all qualified zoologists, conducted the fauna survey with field assistance from Thomas Rasmussen.

2.8 Regional Data

Unlike some other regions in Western Australia no published data on the vertebrate faunal assemblages are available for the Mid West. Data from the following reports were used to supplement the field survey data and to place the survey data in a regional context:

- Alan Tingay & Associates (1996) Environmental report to Kingstream Resources NL on the vertebrate fauna of Koolanooka.
- ATA Environmental (2004) Fauna Assessment, Koolanooka South. Report to Mount Gibson Mining. Report 2004/52.

- ATA Environmental (2004) Fauna Assessment, Koolanooka. Report to Mid-west Iron and Steel. Report 2004/40.
- Emeritus R. Recher's bird species list for the Mt Gibson area compiled over a number of years.
- Hart, Simpson and Associates (2000) Vertebrate fauna survey for the Mt Gibson Area.
- Bamford Consulting Ecologists (2003) Fauna assessment for Tallering Peak. Report to Mount Gibson Mining.
- Bamford Consulting Ecologists (2004) Fauna assessment for Blue Hills. Report to Mid-west Iron and Steel.
- Dell, J. (1996a) Vertebrate faunal assessment in June for Yandanooka.
- Dell, J. (1996b) Vertebrate faunal assessment in October for Yandanooka.
- Mt Gibson Biological Survey (August 2001) Unpublished report.
- Burbidge, A.A., Dixon, K.W. and Fuller, P.J. (1989) The Flora and Fauna of vacant Crown land at White Well, Shire of Dalwallinu, Western Australia. Department of Conservation and Land Management

These reports when considered in the context of the results of the *FaunaBase* search provided an overview of the vertebrate fauna likely to be caught in the project area and within the general region. These data were also considered in a broader context by comparing the reptile assemblage with that in other area areas of Australia.

2.9 Limitations

This assessment is primarily based on Western Australian Museum records made available through '*FaunaBase*', a search of CALM Threatened Fauna list and the known habitat preferences for each species. These databases do not provide a comprehensive coverage of the state and are not adequate to provide species lists for small-scale sites. Large search areas are generally used in order to generate species lists for small sites, but these searches invariably include numerous species not likely to be found at any specific location within the search area. These are significant limitations to the assessment.

The list of species generated from a search of *FaunaBase* did not contain a number of species caught or observed in similar habitat in the region. A number of species that were expected to occur at the site were also not included in the *FaunaBase* generated lists. This information would suggest the area has not been surveyed by people (e.g. researchers, environmental consultants) likely to voucher specimens with the Western Australian Museum. The *FaunaBase* list is therefore likely to be incomplete.

The vertebrate survey at Mount Gibson was conducted over eight days during March 2004. Conclusions and management recommendations about the vertebrate faunal diversity have therefore been made based on the results from this single survey in the area and comparisons made with Hart, Simpson and Associates survey in October 2000 in the context of the results from searches of available databases and regional reports. It is acknowledged that multiple surveys conducted in different seasons, repeated over several years are necessary to cater for seasonal and temporal variations in the faunal assemblage. It is therefore highly probable that we did not catch all of the species in the area.

Different trap types sample the small vertebrate assemblage differently (Thompson and Thompson, 2005). Unlike many of the earlier terrestrial fauna surveys, this trapping program used funnel traps which resulted in a more complete survey of the area. Large reptiles, such as adult *V. giganteus* and *V. panoptes*, are unlikely to be caught in the traps used. However, their size is such that they are more likely to be observed than many smaller cryptic species. An additional limitation of the survey was that bucket and pipe pit-traps were not used at Site 1 due to the impenetrable substrate (solid rock). Funnel traps, Elliott traps and cage traps were, however, used at this site in the same pattern as the other 10 sites.

Invertebrates were sampled as part of the survey methodology, however, Western Australian Museum staff have not been able to process the invertebrates collected and provide feedback on whether there are short-range endemics or other species of importance. Conclusions about invertebrate diversity cannot be made until these data are available. A subsequent targeted short-range endemic invertebrate investigation has been conducted in conjunction with WA Museum staff. Results will be provided in a separate report.

Most semi-arid and arid frog species are only surface active after heavy rains. As the weather was fine and warm for the survey period no frog species were caught or observed. This is a limitation of this survey given there is suitable habitat for frogs within the project area. Based on the database search results, frog species likely to be caught in the area are not considered likely to be of significant conservation concern. Burrowing frogs have been caught in subsequent invertebrate investigations however, none of the species captured are listed as Threatened or Priority species.

Even though two large areas were searched for Malleefowl mounds the entire study site was not searched. Malleefowl mounds were not found in the open Eucalypt woodlands but were instead found in the thickets on the hill slopes and flat areas. The lack of a thorough search of the entire study site is a limitation of this survey. Subsequent investigations in September 2004 and January 2005 were undertaken to target Malleefowl. Results and methodology are in ATA Environmental 2004, Report 188.

Hollow mulga and Eucalypt trees were hand searched in suitable habitat types, however, no *Egernia stokesii badia* were found in the area. Not all trees could be searched in the area and this species may be present and not yet recorded. It should be noted, however, the project area is east of the known distribution of *E. s. badia*. Even when substantial areas were walked searching for Malleefowl mounds between 20-24

September 2004, 13-21 January, 31 March – 2 April, 14-15 and 29-30 April, 9-13 May and 10-11 June 2005 no scat piles characteristic of *Egernia s. badia* were found.

The weather was fine and warm for a large part of the survey period enabling most species of reptile to be sufficiently active to be caught in traps. The night temperatures were also sufficiently warm for nocturnal species to be active. The results are therefore not likely to be limited by daily weather conditions, as the days and nights were suitable for trapping reptiles and small mammals.

The trapping effort undertaken at Mount Gibson during March 2004 was more intense than has previously been conducted in similar surveys in the region (Section 3.10). A wider variety of trap types were also used when compared to other surveys.

The EPA *Guidance for Assessment of Environmental Factors: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia, No. 56* (EPA, 2004) suggests that fauna surveys may be limited by many variables. Limitations associated with each of these variables are assessed in Table 4.

TABLE 4
FAUNA SURVEY LIMITATIONS AND CONSTRAINTS

Possible limitations	Constraint (yes/no); significant, moderate or negligible	Comment
Competency and experience of the consultant carrying out the survey	No	All members of the survey team have had appropriate training, experience and mentoring in vertebrate fauna identification and surveys.
Scope	No	A variety of trapping techniques, opportunistic sightings, digital recording and hand foraging were used to characterise the faunal assemblage.
Proportion of fauna identified, recorded and/or collected	No	All species captured have been previously recorded or were predicted in the area. More species were recorded than other similar surveys previously conducted in similar habitat types indicating that adequate trapping was conducted. A complete inventory of vertebrate species present would only be achieved by multiple surveys repeated over multiple seasons and multiple years.
Sources of information	Moderate	Vertebrate fauna information was available using the Western Australian Museum <i>FaunaBase</i> and unpublished reports conducted on similar habitats in the region. Other less comprehensive surveys have been conducted in the same region as the project area. No detailed or regional databases are available for comparison.
Proportion of the task achieved	No	The conservation value of the area has been demonstrated by this survey and results from other surveys conducted in the region. It is unlikely that further survey work would substantially alter our interpretation of the faunal assemblage for the area.
Timing/weather/season/cycle	Negligible	The timing of the survey was late summer and generally warm. Hart, Simpson and Associates conducted a survey in October 2000. Surveying at other times of the year may have resulted in additional species or a slightly different

Possible limitations	Constraint (yes/no); significant, moderate or negligible	Comment
		assemblage (e.g. wet weather for frogs), however, is unlikely to make a significant difference to our interpretation of the conservation significance of the site.
Disturbances which affected results of the survey	No	No significant disturbances took place during the survey, which would effect the results or conclusions.
Intensity of survey effort	No	The intensity of trapping is higher when compared with other surveys conducted at a similar time and accepted by the EPA.
Completeness	No	Replicate trapping was conducted in each of the habitat types and topographic locations.
Resources	No	Adequate resources were available.
Remoteness and/or access problems	No	There were no access or remoteness issues.
Availability of contextual information on the region	Moderate	WA Museum fauna database, CALM Threatened and Priority species lists, other surveys in region. There are no regional datasets or detailed terrestrial fauna surveys undertaken in similar habitats in the region to provide comparison.

3. RESULTS

3.1 Avifauna

Bird species that may occur at the site and that were observed during the survey period are listed in Appendix 2. Based on the results of the database searches, a total of 144 species of birds may potentially occur in the general vicinity. However, it is unlikely all 144 species would occur at the site due to an absence of specific micro-habitat requirements for many of these species. The disadvantage of lists of predicted species is that, in the process of covering all eventualities, an area can appear to have a more diverse fauna than is actually the case.

Sixty-four bird species were observed during the survey period. Fifteen of these species were very common on site with over 100 individuals recorded across multiple habitats. One to ten individuals were found for 25 species and twenty-four species had between 10 and 100 individuals.

One live and one dead sighting of Malleefowl and 16 inactive Malleefowl mounds were found within the study area during the 2004 fauna survey (Table 6, 7 and Figure 3). It is most likely that a cat or fox killed the Malleefowl. Subsequent investigations targeting Malleefowl found an additional 96 mounds, of which 15 are active. Details of the subsequent Malleefowl investigations are in ATA Environmental 2004 Report #188.

3.2 Reptiles

Up to 66 reptile species may potentially occur in the general vicinity of Mount Gibson (Appendix 4). However, not all of these species will be necessarily present on site, again because of the absence of specific micro-habitat requirements. Thirty-eight of these species were observed during the fauna survey, including four dragons, six snakes, nine geckos, three legless lizards, 11 skinks and four goanna species.

The averaged reptile species accumulation curve based on relative abundance is provided in Plate 2 to indicate the proportion of reptile species likely to have been trapped during the survey. Although, thirty-eight species were captured during the eight day survey, across multiple habitat and topographic units the curve indicates that additional reptile species are present that were not captured in the project area.

3.3 Amphibians

Up to eight species of amphibian may potentially occur in the general vicinity of Mount Gibson (Appendix 4). However, not all of these species will be necessarily present on site, again because of the absence of specific micro-habitat requirements.

No amphibians were captured during March 2004, however tadpoles were observed in pond on the north side of the claypan. In subsequent short-range endemic invertebrate investigations in autumn and winter 2005, *Neobatrachus sutor* and *N. wilsmorei* have

been captured. It is possible that they tadpoles were from a *Neobatrachus* sp. These species have not been included in Appendix 4.

3.4 Mammals

Up to 33 species of mammal may potentially occur in the general vicinity of Mount Gibson (Appendix 5). However, not all of these species will be necessarily present on site, again because of the absence of specific micro-habitat requirements. Twelve species of mammals, including five introduced species were observed during the fauna survey.

3.5 Introduced Species

House mice, goats, rabbits, feral cats and foxes were captured or observed during the survey. Fresh cat and fox tracks were regularly seen on tracks between all trapping sites.

3.6 Invertebrates

Although this survey was directed towards developing an understanding of the vertebrate fauna of the study area, some invertebrates were also collected. This collection was confined to groups where the technical expertise exists to enable identification to be carried out, and to groups that are known for their abundance of short-range endemics. These are species with restricted distributions that are often associated with mesic refugia such as rocky hills in the Murchison. Groups that were collected included mygalomorph spiders, isopods, scorpions, land snails and centipedes. Millipedes also include short-range endemic species, but no millipedes were encountered during the survey. Specimens were lodged with the WA Museum but identifications are not yet available.

A subsequent targeted short range endemic invertebrate investigation has been conducted in conjunction with Western Australian Museum staff during autumn and winter 2005. Results and methodology of this investigation will be provided in a separate report.

3.7 Significant Vertebrate Species Recorded or Listed as Potentially Occurring in the Mount Gibson Area

The fauna species listed in Table 5, which have special ecological status under State and/or Commonwealth government legislation, have been previously recorded or have been listed as having the potential to occur in the vicinity of Mount Gibson.

Five threatened species of fauna and 4 migratory species of birds listed as potentially occurring within the Mount Gibson area were identified under the EPBC Act as having national environmental significance. Threatened and priority species listed

under the *WA Wildlife Conservation Act 1950* and the EPBC Act as potentially occurring at Mount Gibson are listed in Table 5.

It should be noted that according to some interpretations of the EPBC Act 1999, any member of the Accipitridae (Eagles, Kites, Hawks and Bustards), Anatidae (Ducks, Geese and Swans), Charadriidae (Plovers, Dotterels, Lapwings), Falconidae (Kestrels, Falcons, Hobbys), Muscicapidae (Flycatchers), Recurvirostridae (Avocets, Stilts), Scolopacidae (Sandpipers, Turnstones Snipes, Curlews) and Grus (Cranes) families are listed as Migratory Species. It is ATA Environmental's understanding that the Department of Environment and Heritage, as well as officers within the EPA Service Unit, accepts this as an ambiguity in the wording. These family groups are therefore not necessarily intended to be listed as Migratory Species and thereby afforded special protection under the *EPBC Act 1999*. Should a literal interpretation of the Act be adopted, they must be considered to be listed species under the Act and therefore approval is required before disturbance occurs.

TABLE 5
SIGNIFICANT VERTEBRATE SPECIES RECORDED OR LISTED AS
POTENTIALLY OCCURRING IN THE MOUNT GIBSON AREA

Species	Status under Wildlife Conservation Act Schedule / Priority *	Status under Commonwealth Environment Protection and Biodiversity Act	Recorded (R) / Predicted (P)	Comment
Malleefowl <i>Leipoa ocellata</i>	Schedule 1	Vulnerable	R	Species or species habitat <i>recorded</i> within project area
Western Spiny-tailed Skink <i>Egernia stokesii badia</i>	Schedule 1	Endangered	P	Species or species habitat <i>possible</i> in project area
Numbat <i>Myrmecobius fasciatus</i>	Schedule 1		P	Species or species habitat <i>highly unlikely</i> to occur within project area
Peregrine Falcon <i>Falco peregrinus</i>	Schedule 4		P	Species or species habitat <i>likely</i> to occur within project area
Major Mitchell's Cockatoo <i>Cacatua leadbeateri</i>	Schedule 4		R	Species or species habitat <i>likely</i> to occur within project area
<i>Cyclodomorphus branchialis</i>	Priority 2**		P	Species or species habitat <i>unlikely</i> to occur within project area
Australian Bustard <i>Ardeotis australis</i>	Priority 4		P	Species or species habitat <i>likely</i> to occur within project area
Bushstone Curlew <i>Burhinus grallarius</i>	Priority 4		P	Species or species habitat <i>possible</i> within project area
Hooded Plover <i>Charadrius rubricollis</i>	Priority 4	Migratory	P	Species or species habitat <i>unlikely</i> to occur within project area
Rainbow Bee-eater <i>Merops ornatus</i>		Migratory	R	Species or species habitat <i>recorded</i> within project area

** *Cyclodomorphus branchialis* conservation status has now been increased to Schedule 1.

Definitions of the classification system for significant fauna under the *WA Wildlife Conservation Act 1950* are provided in Appendix 8.

3.8 Significant Fauna Recorded from the Study Area

3.8.1 Malleefowl

The Malleefowl is listed as a Schedule 1 species under the *WA Wildlife Conservation Act 1950* and has the status of Vulnerable under the EPBC Act 1999.

Malleefowl are present in the Mount Gibson survey area and probably breed in the area. Sixteen mounds were found within the area during March 2004 however, none were active. One freshly killed bird and one live bird were sighted. Male Malleefowl are reported to occasionally return to inactive mounds and re-use them for breeding many years after they were last utilised (R. Johnstone, Western Australian Museum, pers. comm. 2004). Radio-tracking studies (Booth, 1987 and Benshemesh, 1992 cited in Benshemesh, 2000) have shown that over the course of a year Malleefowl may range over one to several square kilometres and that home-ranges overlap considerably. The number of mounds in the area after subsequent investigations in September 2004 and January 2005 is 113 with 15 active.

It is recommended that a Fauna Management Plan be written for the project area. The Fauna Management Plan for the project should pay particular attention to minimising the potential disturbance to these birds. Buffer zones around each Malleefowl mound should be applied to minimise disturbance on Malleefowl as they regularly feed away from the mounds; and during the egg incubation period males will return daily to the mound to maintain the incubation temperature. Food resources and adequate organic matter are normally the limiting factors associated with the size of the activity area (R. Johnstone, Western Australian Museum, pers. comm. 2004). Therefore it is important that large tracts of undisturbed land are segregated to provide relatively undisturbed breeding and feeding sites. The number of birds, and the breeding success of this population, should be regularly monitored throughout the life of the mine. Detectable decline in population numbers should initiate immediate corrective action.

The presence of the Malleefowl requires referral under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

TABLE 6
LOCATION OF INACTIVE MALLEEFOWL MOUNDS FOUND IN THE
MOUNT GIBSON AREA IN MARCH 2004

Mound 1	50 516707 E	6727532 N
Mound 2	50 516515 E	6728409 N
Mound 3	50 517091 E	6728160 N
Mound 4	50 516986 E	6728163 N
Mound 5	50 517120 E	6728058 N
Mound 6	50 517104 E	6728043 N
Mound 7	50 516877 E	6727636 N
Mound 8	50 516821 E	6727632 N
Mound 9	50 516770 E	6727676 N
Mound 10	50 516787 E	6727560 N
Mound 11	50 516601 E	6727555 N
Mound 12	50 516673 E	6727903 N
Mound 13	50 516691 E	6727901 N
Mound 14	50 516697 E	6728430 N
Mound 15	50 516659 E	6727884 N
Mound 16	50 516704 E	6728427 N

TABLE 7
LOCATION OF LIVE MALLEEFOWL AND FRESH KILLED
MALLEEFOWL FOUND IN MARCH 2004

Live Malleefowl	50 518452 E	6726354 N
Fresh killed Malleefowl	50 516856 E	6728589 N

3.8.2 Other Significant Species Recorded

The Rainbow Bee-eater (a Migratory species listed under the EPBC Act 1999) was observed in the project area. The Rainbow Bee-eater is found across the better-watered parts of Western Australia. It prefers lightly wooded, preferably sandy soil near water. Rainbow Bee-eaters are scarce to very common across their range depending on suitable habitat conditions. Rainbow Bee-eaters were observed during this survey and during surveys by Emeritus Professor Harry Recher and Hart, Simpson and Associates. There are large amounts of suitable habitat for this species in the undisturbed areas adjacent to the proposed mine site.

It is unlikely that development activity associated with the mine will appreciably modify, destroy or isolate an area of important habitat, or seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population. The habitat utilised by Rainbow Bee-eaters is common in the Mid-west region and in areas adjacent to the proposed mine site, therefore the impact of disturbance at Mount Gibson will be very minor. Rainbow Bee-eaters that might have nested in the mine site have plenty of alternative suitable sites nearby.

Major Mitchell's Cockatoo (*Cacatua leadbeateri*; Schedule 4 under the *WA Wildlife Conservation Act 1950*) was previously seen at Mount Gibson by Hart, Simpson and Associates (2000) and Emeritus Professor Harry Recher. However, it was not

observed by ATA Environmental during March 2004 or in subsequent investigations between 20-24 September 2004, 13-21 January, 31 March – 2 April, 14-15 and 29-30 April, 9-13 May and 10-11 June 2005.

3.9 Descriptions of Threatened or Priority Species Under *WA Wildlife Conservation Act 1950-1979* That Were Listed as Being Potentially Found in the Mount Gibson Region

The following provide commentary on fauna that is listed in *FaunaBase* or a search of the CALM Threatened fauna database as being potentially found in the Mount Gibson region.

3.9.1 Schedule 1 – Fauna Which are Rare or Likely to Become Extinct

Numbat (*Myrmecobius fasciatus*) – The Numbat was formally widespread across southern semi-arid and arid Australia. It is now only present at Dryandra and Perup/Kingston area east of Manjimup; however, populations have been reintroduced by translocation to numerous other locations including Karroun Hill Nature Reserve. CALM records show no observations in the Mount Gibson area in the past. Although suitable habitat may be present the Numbat is highly unlikely to be in the study area because of its range restriction.

Western Spiny-tailed Skink (*Egernia stokesii badia*) – The Western Spiny-tailed Skink occurs in semi-arid scrubs and woodlands of Shark Bay and the northern wheatbelt, sheltering in hollow logs, behind the bark of fallen trees and old abandoned buildings. Twenty-two records have been made since 1929 in the region, however, most are west of Mount Gibson. Even though suitable habitat is found in the area, the Western Spiny-tailed Skink is unlikely to be found at Mount Gibson as it is on the eastern margin of its known distribution. None were recorded by Hart, Simpson and Associates.

Cyclodomorphus branchialis – Formally listed as Priority 2 (Taxa with few, poorly known populations on conservation lands, or taxa with several, poorly known populations not on conservation lands), *Cyclodomorphus branchialis* is a medium sized skink found in semi-arid scrubs on heavy soils. It has a restricted distribution in the south-west Murchison and the project area is at the eastern limit of its range. Even though suitable habitat is found in the area, *Cyclodomorphus branchialis* is unlikely to be found at Mount Gibson as this area is outside of its known distribution

3.9.2 Schedule 4 - Fauna that are in Need of Special Protection

Peregrine Falcon (*Falco peregrinus*) – The Peregrine Falcon is uncommon, although widespread throughout much of Australia excluding the extremely dry areas and has a wide and patchy distribution. It shows habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. It favours hilly or mountainous country and open woodlands and may be an occasional visitor to the study area. They have not been previously observed at Mount Gibson by Emeritus Professor Harry Recher or during the Hart, Simpson and Associates survey.

Major Mitchell's Cockatoo (*Cacatua leadbeateri*) – Major Mitchell's Cockatoos are birds of the semi-arid and arid zones of all parts of Australia, except Tasmania. Major Mitchell's Cockatoos are most often seen high up in the branches of Salmon Gums (*Eucalyptus salmonophloia*) and similar large eucalypts, in heavily timbered creek-lines or roadside verges, in parts of the wheatbelt of Western Australia. It is these large, hollow eucalypts which the Major Mitchell's Cockatoo require to breed in. Major Mitchell's Cockatoos are scarce throughout most of WA and the primary cause for its decline is land clearing for agriculture and subsequent fragmentation of remaining habitat. Emeritus Professor Harry Recher and Hart, Simpson and Associates found Major Mitchell's Cockatoo during their surveys.

3.9.3 Priority 4 - Taxa in Need of Monitoring

Australian Bustard (*Ardeotis australis*) – Australian Bustards are tall birds that live on open grassy plains and low shrubby areas in northern Australia. The Australian Bustard is possibly found at Mount Gibson due to the availability of suitable habitat. They have not been previously observed at Mount Gibson by Emeritus Professor Harry Recher or during the Hart, Simpson and Associates survey.

Hooded Plover (*Charadrius rubricollis*) – The Hooded Plover frequents the margins and shallows of salt lakes, also along coastal beaches, where it forages for invertebrates along the water's edge. It is found along the southern coasts and salt lakes north to Port Gregory, Three Springs, Mt Gibson, Lake Brown, Lake Barlee, Lake Cowan and Eyre, and including Rottneest Island. It is scarce to common throughout the rest of its distribution. The Hooded Plover is unlikely to be found in the Mount Gibson, if it was, it would be classified as a vagrant. They have not been observed at Mount Gibson by Emeritus Professor Harry Recher or during the Hart, Simpson and Associates survey.

Bush Stone-curlew (*Burhinus grallarius*) – The Bush Stone-curlew is a large, slim, mainly nocturnal, ground-dwelling bird. It is regarded as uncommon or rare having declined as a result of feral cats and foxes. It can be found in open wooded country or scrubs, in many other habitats. CALM records suggest it is likely to occur in the area in question. They have not been observed at Mount Gibson by Emeritus Professor Harry Recher or during the Hart, Simpson and Associates survey.

3.10 Trap Type and Survey Effort Comparison

There are many different trapping strategies used to measure small reptile and mammal assemblages. These include the use of cage traps and Elliott traps of varying sizes, snap traps, stick traps, funnel traps and opportunistic observations (road kill, hand searching, etc). Over the past 15 years, pit-traps have become an accepted methodology for surveying small terrestrial vertebrates, although the type of pit-trap used and the layout of the pit-trap arrays and grids can vary (Thompson and Thompson, 2005).

The ATA Environmental 2004 survey used a variety of trapping techniques including pit-traps (two types; 20L buckets and 150mm diameter PVC pipes), funnel traps, avifauna surveys, Elliott traps, cage traps and opportunistic hand searching. The

previous surveys in the area used similar survey techniques, however, none have used funnel traps. Table 8 shows the number of captures per trap type and demonstrates that most reptile captures were a result of using funnel traps. Some species that are routinely caught in funnel traps are seldom if ever caught in pit-traps (e.g. large snakes). The use of funnel traps means that the available small vertebrate fauna is more adequately surveyed. Different trap types capture a different component of the vertebrate assemblage and without employing a variety of trapping techniques it is not possible to fully sample the vertebrate assemblage for an area. This is a significant limitation with the previous surveys that have been conducted at Mount Gibson and its surrounds.

TABLE 8
REPTILE AND MAMMAL CAPTURES PER TRAP TYPE AT
MOUNT GIBSON

Reptiles	Bucket	Funnel	Pipe	Elliott	Cage	Opportunistic
<i>Brachyurophis semifasciatus</i>		1				
<i>Cryptoblepharus carnabyi</i>			1			
<i>Cryptoblepharus plagiocephalus</i>	1					3
<i>Ctenophorus cristatus</i>		4				13
<i>Ctenophorus reticulatus</i>		1	1			1
<i>Ctenophorus scutulatus</i>	7	4	3			106
<i>Ctenotus schombergki</i>	3	7	3			2
<i>Ctenotus severus</i>	1					1
<i>Delma australis</i>						2
<i>Demansia pssamophis</i>		1				
<i>Diplodactylus graneriensis</i>		1	1			1
<i>Diplodactylus mainii</i>	1					2
<i>Diplodactylus pulcher</i>	3	1	1			17
<i>Diplodactylus squarrosus</i>						7
<i>Egernia depressa</i>	1	2				5
<i>Egernia inornata</i>		1				2
<i>Gehyra variegata</i>	4	2	2			21
<i>Heteronotia binoei</i>	2	8				31
<i>Lerista gerrardii</i>						16
<i>Lerista mueleri</i>						1
<i>Lialis burtonis</i>						1
<i>Menetia greyii</i>	3	1				3
<i>Moloch horridus</i>		3				3
<i>Morethia butleri</i>			1			1
<i>Parasuta monachus</i>						2
<i>Pogona minor</i>		1				2
<i>Pseudonaja nuchalis</i>						1
<i>Pygopus nigriceps</i>		1				
<i>Rhynchoedura ornata</i>	1					15
<i>Simoselaps bertholdi</i>		2				1
<i>Strophurus assimilis</i>						2
<i>Suta fasciata</i>						2
<i>Tiliqua occipitalis</i>						2
<i>Underwoodisaurus milii</i>						1
<i>Varanus caudolineatus</i>						1
<i>Varanus gouldii</i>						1
<i>Varanus panoptes</i>						1
<i>Varanus tristis</i>		1				1
Number of individuals	27	42	13	0	0	271
Species richness	11	18	8	0	0	34

Mammals							
	<i>Felis catus</i>						2
	<i>Vulpes vulpes</i>						3
	<i>Sminthopsis dolichura</i>						1
	<i>Mus musculus</i>				1		1
Number of individuals					1		7
Species richness					1		2

The trapping effort undertaken at Mount Gibson during March 2004 was more intense and used a wider variety of trap types when compared to other surveys in the region (Table 9).

TABLE 9
COMPARISON OF TRAP TYPE AND INTENSITY OF SURVEYS
UNDERTAKEN IN REGION

Trap type						Survey location and source
Bucket Pit-trap nights	Pipe-pit trap nights	Funnel trap nights	Elliott trap nights	Cage trap nights	Total trap nights	
360	360	1580	395	288	2983	This survey
335	335	1340	335	268	2613	Koolanooka South (ATA, 2004)
255	255	-	255	255	1020	Koolanooka (ATA, 2003)
520	-	-	1600	-	2120	Mount Gibson Station (Anon, 2001)
200	-	500	250	125	1075	Blue Hills (Bamford, 2004)
416	-	-	338	76	830	Hart, Simpson and Associates (2000)
389	-	-	430	-	819	White Wells (Burbidge <i>et al.</i> , 1989)
94	-	-	1200	-	1294	Yandanooka (Dell, 1996a)
88	-	-	680	-	768	Yandanooka (Dell, 1996b)

In addition to increased trapping effort, ATA Environmental used funnel traps, which are a trapping strategy not employed in fauna surveys until very recently. Funnel traps significantly increase the overall abundance of captured animals and catch species that would not normally be caught in pit and cage traps. Additional survey effort would no doubt increase the species count for the project areas, however, as How (1998) and Thompson *et al.* (2003b) indicate, terrestrial fauna surveys for the purpose of preparing environmental impact assessment in WA have almost never undertaken sufficient trapping effort to adequately assess species diversity at undisturbed sites.

Catch rates were highest for reptiles in funnel traps and then 20L bucket pit-traps. This is similar to capture pattern to reptiles in the Goldfields of Western Australia (Thompson and Thompson, 2005). Had a diverse trapping strategy not been employed a number of species may not have been caught and overall abundance of captures would have been significantly lower.

4. DISCUSSION

4.1 Other Studies

A variety of unpublished fauna surveys have been conducted in the region. These data and the results of the ATA Environmental 2004 survey are shown in Appendices 2, 6 and 7.

Hart, Simpson and Associates conducted a similar fauna survey in the same area in October 2000. Nineteen additional species of reptile were recorded in the 2004 fauna survey, compared with the 2000 fauna survey (five additional species of snake, four species of gecko, three species of legless lizard, four species of skink and three species of goanna). One species of gecko and one species of skink were caught in October 2000, but not in March 2004. The increase in reptile species richness recorded in the 2004 survey is most probably due to increased trapping effort and the use of funnel traps, which were not used in October 2000. No frogs were caught in either survey. Burbidge *et al.* (1989) recorded 29 species of reptile and one (possibly two) species of frog. Our March 2004 survey recorded nine additional species of reptiles and subsequent investigations by ATA Environmental in autumn and winter 2005 have confirmed two species of frog (*Neobatrachus sutor* and *N. wilsmorei*) although they are different to species recorded by Burbidge *et al.*, (*N. centralis* and *N. sp.*).

Hart, Simpson and Associates observed two additional mammal species in October 2000 than during the March 2004 survey. They captured a Chocolate Wattled Bat in an old mine shaft and observed an old burrow previously used by a Burrowing Bettong (*Bettongia lesueur*). During the 2004 survey, no bats were present in this mine shaft. ATA Environmental has subsequently found out that training activities conducted by a nearby mining company in the mine shaft may have lead to the disturbance and possible death of the bats. The Burbidge *et al.* (1989) survey of White Wells area recorded a higher number of mammal species than our March 2004 survey. Their records included a mixture of widespread species including the Echidna, Lesser Long-eared Bat and Gould's Wattled Bat, species of arid regions near their south western limit including the Red Kangaroo, Sandy Inland Mouse and Western Broad-nosed Bat and species of the south-west including Gilberts Dunnart, White-tailed Dunnart, Gould's Long-eared Bat and King River Eptesicus. Burbidge *et al.* (1989) made special comment about White-tailed Dunnart an uncommonly recorded species of the inland parts of the south-west and of Gould's Wattled Bat which is at the inland periphery of its range. Burbidge *et al.* (1989) also recorded his highest diversity of bats in the woodlands, with 83 individuals of seven species being caught over 3 nights. It is unknown exactly where the sampling sites were, however, it appears that they are south west of the proposed mining areas.

The Burrowing Bettong record is based on an observation of an old burrow. Burrowing Bettongs are extinct regionally, but the burrows are often still present many years later. Goannas and rabbits usually occupy these burrow systems.

Emeritus Professor Harry Recher (previously of Edith Cowan University) observed 75 species of birds in the Mount Gibson study area, whereas ATA Environmental found 64 species and Burbidge *et al.*, 60 species. The additional species observed by

Professor Recher are likely to be due to an increased survey effort spread over multiple seasons and multiple survey periods (September 2000; October 2000; August 2001; July 2002 and September 2003) compared with the single survey by ATA Environmental. No additional Threatened or Priority bird species were observed by Professor Recher. Excluding some of the wetland birds species, the bird assemblage at Mount Gibson appears similar to other locations previously surveyed in the Mid-west (Appendix 2).

4.2 Assemblages with Ecological Significance

The EPA's Position Statement No. 3 (EPA, 2002) indicate that field survey data should be used to assess the impact of the development on species and ecosystems.

Thompson *et al.* (2003a) described the pit-trappable reptile assemblages for biotopes and heterogenous habitats for numerous semi-arid, arid and mesic sites in Australia. Typically, heterogenous sites have between 27 and 50 species, larger areas have higher species richness. Biotopes generally have between 17 and 35 reptile species. The composition of arid and semi-arid reptile assemblages is made up of mostly skinks and geckos, with less agamids and elapids, and fewer varanids, pygopods and blind snakes. Thirty-eight reptile species were observed during the Mount Gibson fauna survey, including four dragon lizards, six snakes, nine geckos, three legless lizards, 11 skinks and four goanna species. Although Mount Gibson had less reported species, the composition is similar to that which Thompson *et al.* (2003a) report for other semi-arid sites. Additional survey effort would no doubt increase the species count for the area. However, as How (1998) and Thompson *et al.* (2003b) indicate, terrestrial fauna surveys for the purpose of preparing environmental impact assessment in Western Australia have almost never undertaken sufficient trapping effort to adequately assess species diversity at undisturbed sites.

For small mammal species, sites with heterogenous habitat types typically have up to 15 trappable small terrestrial species and six to eight species of bats (McKenzie *et al.* 1983; 1992; 2000), and larger more habitat diverse sites can have a higher diversity (How and Cooper 2002). For biotopes or habitats that are less diverse, the number of small trappable mammal species is generally between five and eight species (Masters 1993, How and Cooper 2002, unpublished data for the Goldfields). The small vertebrate mammal assemblage at Mount Gibson has slightly less species than is generally found in other semi-arid habitats in Western Australia. There is nothing about the assemblage or the species in that assemblage that indicate that it has particular conservation significance.

It is particularly difficult to quantify bird assemblages at a site as there are appreciable temporal variations driven by seasonal effects, specific rain events, droughts, etc. The bird assemblage represented on a presence – absence basis for Mount Gibson appears to fit in with the regional pattern (see Appendix, 2, 6 and 7). Similar habitat in the broader region will mean that local bird species will have a range of alternative foraging and breeding sites when the vegetation on Mount Gibson project area is cleared.

Based on the available information, other than for a small number of bird species that are of specific conservation interest, the faunal assemblage at Mount Gibson appears very similar to that which might be expected in any one of a number of habitats in the region. There was nothing to indicate that at a genetic, species or ecosystem scale, that Mount Gibson is important from a biodiversity perspective.

5. CONCLUSION AND RECOMMENDATIONS

The ATA Environmental fauna survey of the Mount Gibson area recorded 358 individual reptiles and mammals, with a total of 112 species observed during the survey. Sixty-four species of birds, thirty-eight species of reptiles and ten species of mammals (five introduced) were observed during the survey. The low number of bird species is attributed to low rainfall preceding the survey and subsequent lack of flowering plants and insect activity within the area. As many arid birds are highly nomadic and regions further north of the study site had recent rainfall (e.g., the Pilbara), it is envisaged that some species that would be expected to occur at Mount Gibson have moved elsewhere to forage. The ATA Environmental survey conducted in March 2004 recorded similar species of birds, reptiles and mammals to the Hart, Simpson and Associates survey from October 2000, Burbidge *et al.*, (1989) and other surveys conducted in the region.

Malleefowl and Rainbow Bee-eaters were the only two species listed under the EPBC Act that were observed in the study area. Although listed as migratory, the Malleefowl is not considered a true migratory species. Malleefowl are present in the area, and it is highly probable that the area supports a breeding population. The presence of the Malleefowl will require a referral to the Department of Environment and Heritage under the EPBC Act if the proposed clearing could possibly have a significant impact on these species. A Fauna Management Plan should be prepared for the project that should include a Malleefowl Conservation Strategy. Subsequent targeted surveys have been completed for Malleefowl and 113 mounds, 15 active have been recorded in the region. Details in are Report 2004/188. These data are sufficiently extensive that ongoing monitoring of the Malleefowl population while mining is in progress is possible. Appropriate buffer zones and foraging areas should be included in the Malleefowl Conservation Strategy to ensure this population has adequate breeding and foraging areas.

It is unlikely mining activity will substantially modify, destroy or isolate an area of important habitat of the Rainbow Bee-eater, or seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of this species because habitat utilised by the Rainbow Bee-eater is found extensively in the surrounding areas.

Major Mitchell's Cockatoo, classified as Schedule 4 under the *WA Wildlife Conservation Act 1950*, was previously seen at Mount Gibson by Hart, Simpson and Associates (2000) and Emeritus Professor Harry Recher. However, the species was not found by ATA Environmental during March 2004. The habitats utilised by this Cockatoo are widespread in the surrounding area and the sites that will be impacted upon during the mining development are small in comparison to the surrounding habitat. It is estimated that only 0.21% of the total current extent of potential Major Mitchell's Cockatoo habitat associated with the project area (i.e. Vegetation Association No. 142 – "Medium Woodland; York Gum and Salmon Gum") (Beeston *et al.*, 2002) will be impacted by the proposed mining development. The impacts associated with further disturbances at each of these sites will have a low impact on Major Mitchell's Cockatoo.

Carnaby's Cockatoo (*Calyptorhynchus latirostris*) classified as Endangered under the *EPBC Act* 1999 and Schedule 1 under the *WA Wildlife Conservation Act 1950* is a species of conservation interest through southern WA. Its preferred habitat is woodland where it preferentially feeds on plants of the Proteaceae family. Preferred nesting trees include the smooth-barked Salmon Gum (*Eucalyptus salmonophloia*), which contain deep hollows. Nesting also occurs in Marri (*Corymbia calophylla*) and Tuart (*E. gomphocephala*).

Carnaby's Black-Cockatoos were not recorded in any of the surveys at Mount Gibson or in the broader region (ATA Environmental, 2004a, b; Alan Tingay & Associates 1996; Hart, Simpson and Associates, 2003; Bamford, *et al.* 2003, 2004; Burbidge, *et al.* 1989; Dell, 1996a, b). Given the known distribution of Carnaby's Cockatoo is to the south and west of the proposed Mount Gibson mine site it is highly unlikely that the mine will impact on breeding or feeding areas used by this species.

Any clearing of land or disturbance associated with developing a mine site will have an impact on individual species, species assemblages and the functional value at the site level, however, the proposed disturbance at Mount Gibson is not anticipated to have a significant impact on any of these scales in a regional context. The five species of agamids, seven species of elapids, 10 species of geckoes, three species of legless lizards, 13 species of skinks and four species of goanna is typical of the reptile assemblage encountered in most arid and semi-arid areas in Australia. Thompson *et al.* (2003) reviewed reptile biodiversity at 12 landscape or regional scale sites across Australia. The reptile assemblage at Mount Gibson is not significantly different to that found at these sites. There was no obvious feature of the reptile assemblage that warrants special attention or protection as the reptile assemblage in the surrounding area would be similar. Other than the Woma Python, *Cyclodomorphus branchialis* and Western Spiny-tailed Skink, none of the reptile species caught or listed as potentially being found in the area are considered rare, have disjunction populations or require special protection.

Hart, Simpson and Associates recorded a similar assemblage of mammals in October 2000 to the ATA Environmental March 2004 survey, however, Burbidge *et al.*, (1989) recorded a greater diversity during their surveys in September/October and December 1982. Our conclusion is that the composition of the small mammal assemblage is also what would be expected of a semi-arid habitat with none of the species caught representing disjunct populations or requiring special protection.

Bird observations by ATA Environmental in March 2004 are similar to the records by Burbidge *et al.*, for White Wells, Hart, Simpson and Associates and Emeritus Professor Harry Recher for Mt Gibson, and are also similar to bird assemblages recorded by Recher in the surrounding area. This suggests that the disturbance impact associated with the proposed mine at Mount Gibson will not be significant in a regional context, as similar bird assemblages and habitat are found in nearby areas.

Therefore, ATA believes the proposed development at Mount Gibson is unlikely to significantly impact on the overall vertebrate biota (other than possibly the Malleefowl) of the region. The sandplain habitats surrounding the ironstone range found at Mount Gibson are similar to the surrounding area and the sites that will be impacted upon during the mining development at Mount Gibson are small in

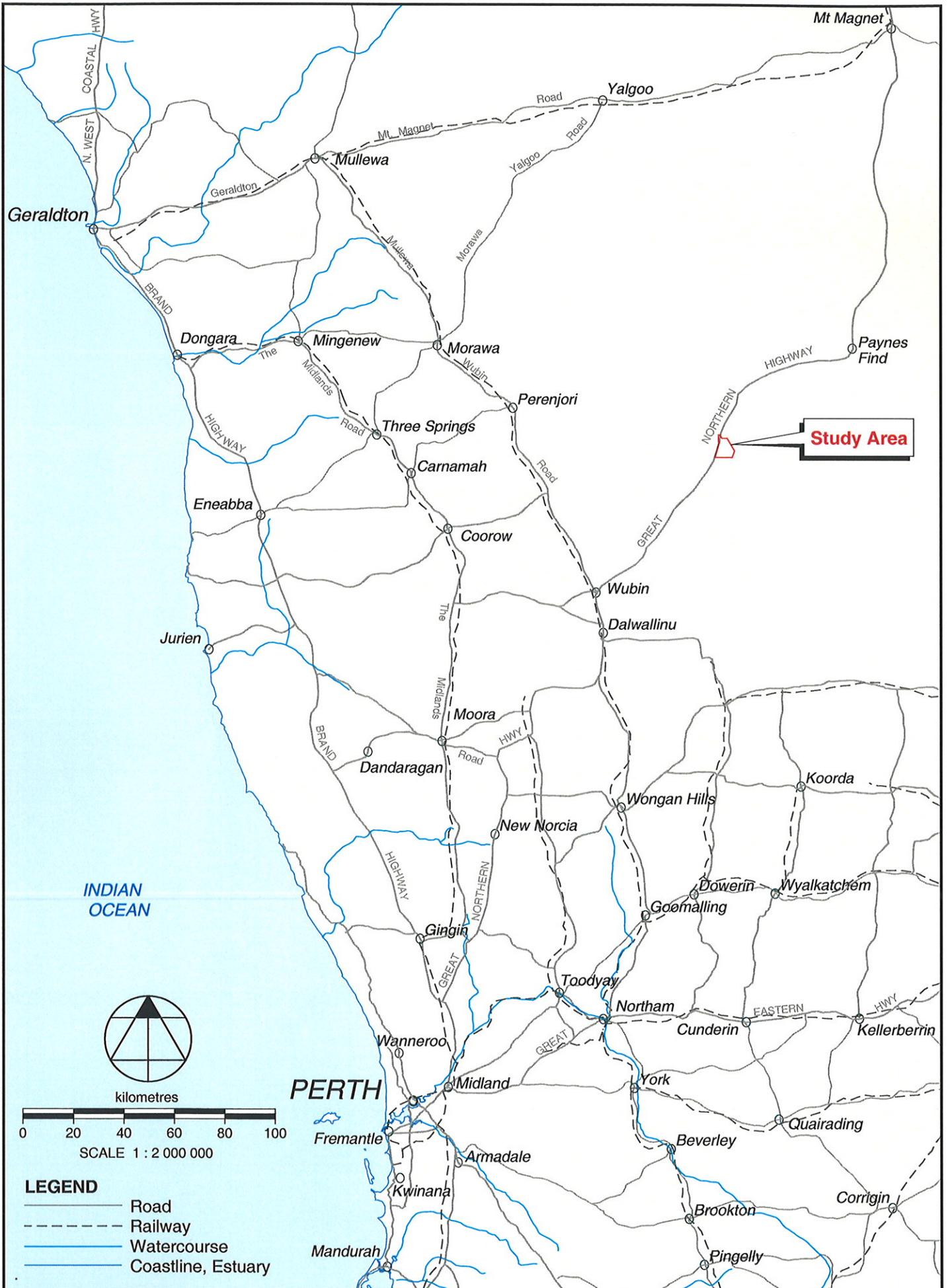
comparison to the surrounding habitat. ATA Environmental contends the proposed mine will generally have a minimal impact on vertebrate species in the area, other than possibly the Malleefowl. Ecologically important species including Malleefowl, Rainbow Bee-eaters, Major Mitchell's Cockatoo or other species listed in Table 4, will need additional monitoring, as they are listed as Threatened or Endangered under State and Commonwealth legislation.

REFERENCES

- Alan Tingay and Associates, (1996). *Vertebrate Fauna: Koolanooka Mine Site, Morowa*, Environmental report to NL.
- Aplin K.P. and Smith L.A. (2001). Checklist of the Frogs and Reptiles of Western Australia. *Records of the Western Australian Museum, Supplement No. 63*, 51-74.
- ATA Environmental, (2004a). *Fauna Assessment: Koolanooka*, Environmental report to Mount Gibson Mining Ltd, ATA 2004/40.
- ATA Environmental, (2004b). *Fauna Assessment: Koolanooka South*, Environmental report to Mount Gibson Mining Ltd, ATA 2004/52.
- Bamford Consulting Ecologists, (2003). *Fauna Assessment for Talling Peak*, Report to Mount Gibson Mining Ltd.
- Bamford M.J. & Wilcox J.A (2004) Blue Hills Fauna Assessment. Unpublished Report prepared for ATA Environmental, March 2004.
- Beard (1990). *Plant Life of Western Australia*. Kangaroo Press.
- Bennett Environmental Consulting (2000). *Flora and Vegetation of Mt Gibson*. Prepared for Mt Gibson Iron Limited.
- Benshemesh, J. (1992). *The Conservation Ecology of Malleefowl, with Particular Regard to Fire*. PhD Thesis. Monash University, Clayton: *cited in* Benshemesh, J. (2000) National Recovery Plan for Malleefowl, Environment Australia. <http://www.deh.gov.au/biodiversity/threatened/recovery/malleefowl/>
- Benshemesh, J. (2000). National Recovery Plan for Malleefowl, Environment Australia. <http://www.deh.gov.au/biodiversity/threatened/recovery/malleefowl/>
- Booth, D.T. (1987). Home range and hatching success of Malleefowl, *Leipoa ocellata* Gould (Megapodiidae), in Murray mallee near Renmark, S.A. *Australian Wildlife Research* 14: 95-104: *cited in* Benshemesh, J. (2000) National Recovery Plan for Malleefowl, Environment Australia. <http://www.deh.gov.au/biodiversity/threatened/recovery/malleefowl/>
- Burbidge, A.A., Dixon, K.W., & Fuller, P.J. (1989). *The Flora and Fauna of Vacant Crown Land at White Well, Shire of Dalwallinu, Western Australia*. Department of Conservation & Land Management.
- Dell, J., (1996a). *Results of the Spring 1996 Vertebrate Fauna Survey of Yandanooka Project Area*.
- Dell, J., (1996b). *Vertebrate Faunal Assessment of Yandanooka Project Area*.

- Hart, Simpson and Associates Pty Ltd (2000). Mt Gibson Iron Pellet Project: Fauna survey.
- How R.A, Cooper N.K and Bannister J.K (2001). Checklist of the Mammals of Western Australia. *Records of the Western Australian Museum, Supplement No. 63*, 91-98
- Johnstone, R.E. and Storr, G.M. (1998). Western Australian Birds: Volume I – Non-Passerines (Emu to Dollarbird). W.A. Museum, Perth.
- Johnstone, R.E. and Storr, G.M. (2004). Western Australian Birds: Volume II – Passerines (Blue-winged Pitta to Goldfinch). W.A. Museum, Perth.
- Johnstone, R. (2001). Checklist of the birds of Western Australia. *Records of the Western Australian Museum, Supplement No. 63*, 75-90.
- Recher, H. (2004). Personal Communication. Emeritus Professor of Natural Sciences at Edith Cowan University.
- Storr, G.M., Smith, L.A. and Johnstone, R.E. (1983). Lizards of Western Australia II. Dragons and Monitors. W.A. Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone, R.E. (1986). Snakes of Western Australia. W.A. Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone, R.E. (1990). Lizards of Western Australia. III. Geckoes and Pygopodids. W.A. Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone, R.E. (1999). Lizards of Western Australia. I. Skinks. 2nd edition. W.A. Museum, Perth.
- Strahan, R. (ed.). (1995). The Australian Museum Complete Book of Australian Mammals. 2nd edition. Angus and Robertson, Sydney.
- Thompson, G.G. and Thompson, S.A. (2003). Diversity and abundance of pit-trapped reptiles of arid and mesic habitats in Australia: Biodiversity for environmental impact assessments. *Pacific Conservation Biology* 9: 120-35
- Thompson, S.A., Thompson, G.G. and Withers, P.C. (2005). Influence of pit-trap type on the interpretation of fauna diversity. *Wildlife Research*.
- Tyler, M.J., Smith, L.A. and Johnstone, R.E. (2000). Frogs of Western Australia. 2nd edition. W.A. Museum, Perth.
- Wager, R. and Jackson, P. (1993). The Action Plan for Australian Freshwater Fishes. Environment Australia, Canberra.
- Vital Options Consulting (2004). *Nyingarn – Ninghan Indigenous Protected Area Plan of Management 2004*. Pindiddy Aboriginal Corporation.

FIGURES



FAUNA ASSESSMENT, MOUNT GIBSON
REGIONAL LOCATION

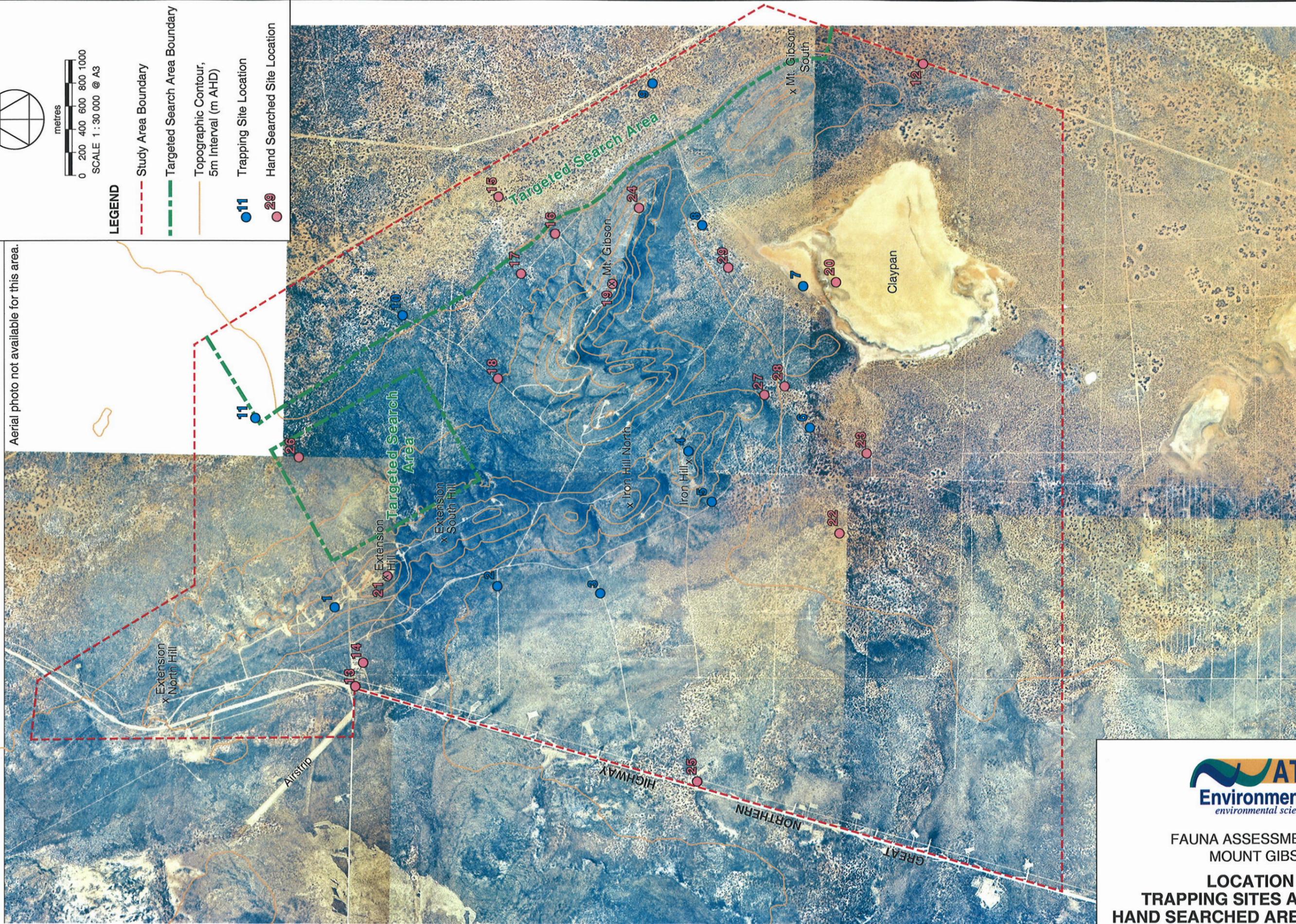
FIGURE 1

Aerial photo not available for this area.

LEGEND

- Study Area Boundary
- Targeted Search Area Boundary
- Topographic Contour, 5m Interval (m AHD)
- 11 Trapping Site Location
- 20 Hand Searched Site Location

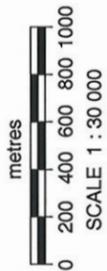
metres
0 200 400 600 800 1000
SCALE 1 : 30 000 @ A3



FAUNA ASSESSMENT
MOUNT GIBSON
**LOCATION OF
TRAPPING SITES AND
HAND SEARCHED AREAS**

FIGURE 2

Aerial photo not available for this area.



LEGEND

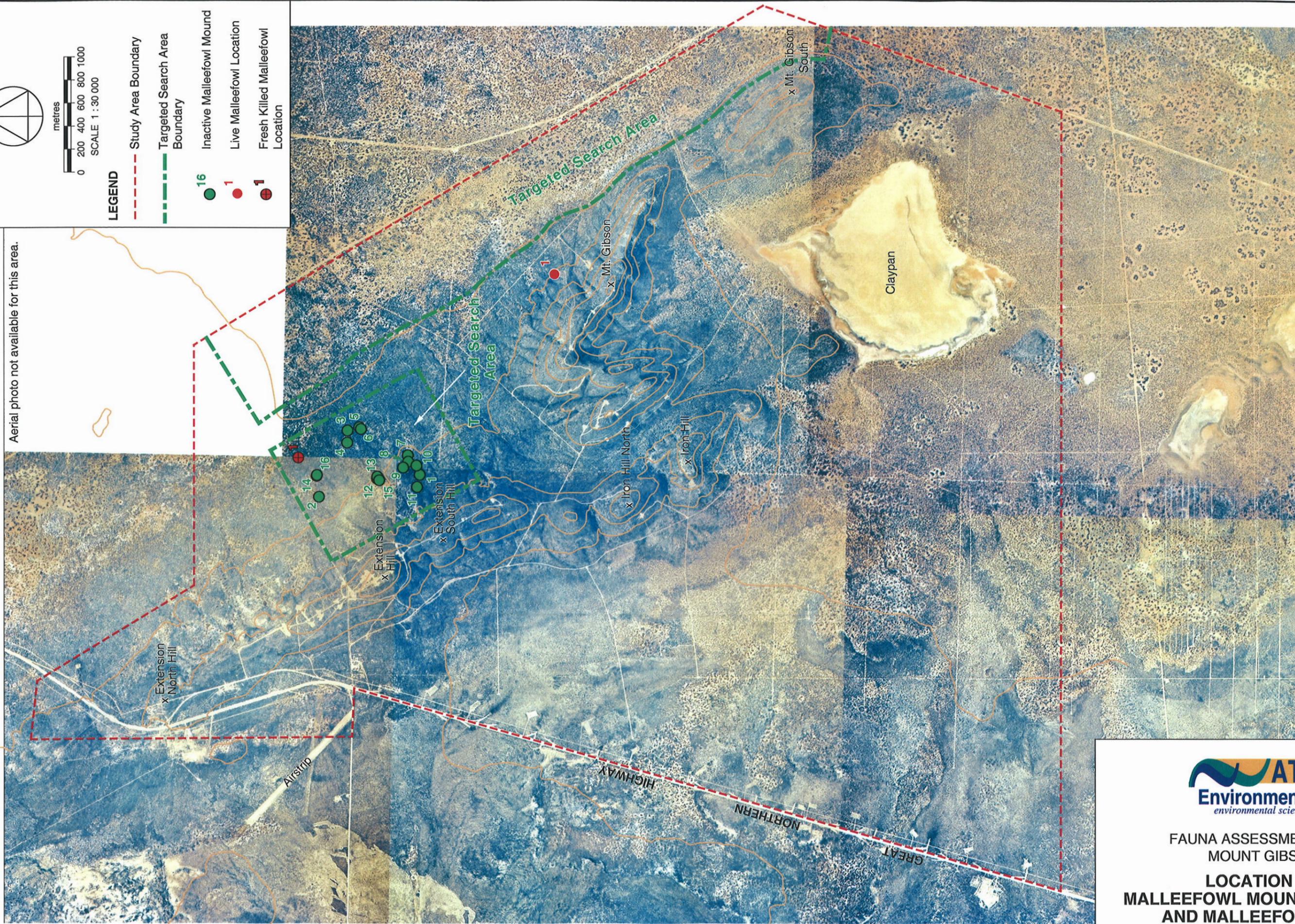
--- Study Area Boundary

--- Targeted Search Area Boundary

● 16 Inactive Malleefowl Mound

● 1 Live Malleefowl Location

● 1 Fresh Killed Malleefowl Location



**FAUNA ASSESSMENT
MOUNT GIBSON
LOCATION OF
MALLEEFOWL MOUNDS
AND MALLEEFOWL**

FIGURE 3

PLATES

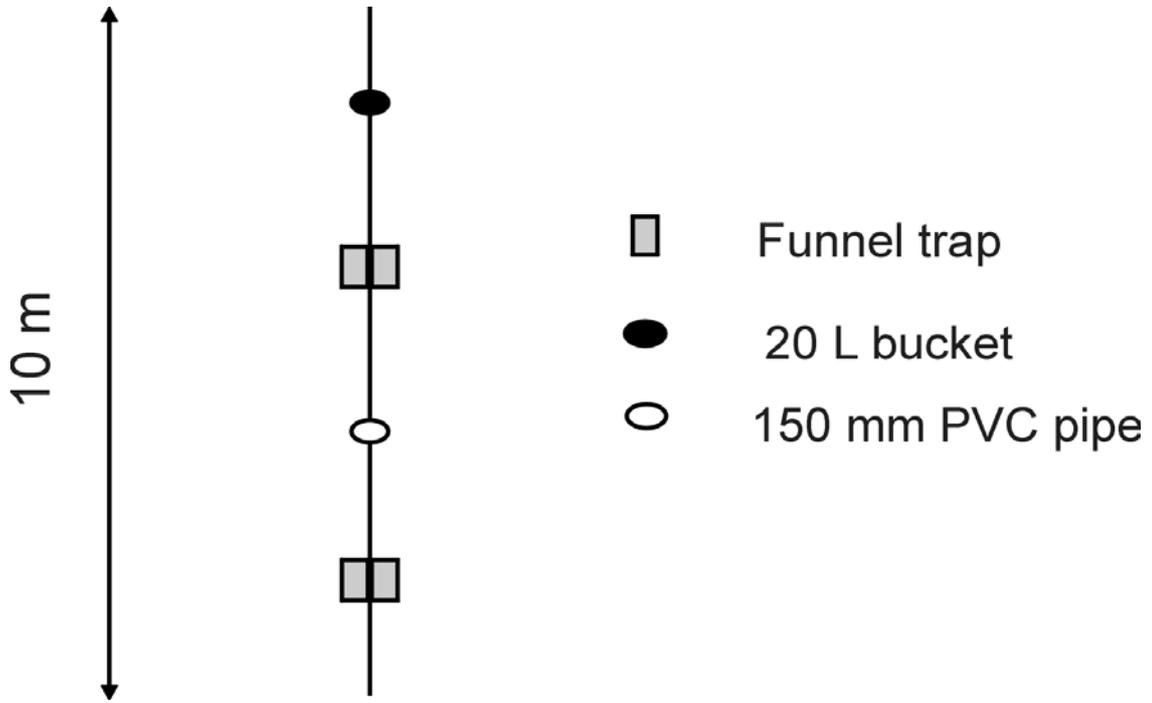


Plate 1 Pit-trap Drift Fence Showing a 20L Bucket Pit-trap, 150mm PVC Pipe Pit-trap and Pair of Funnel Traps

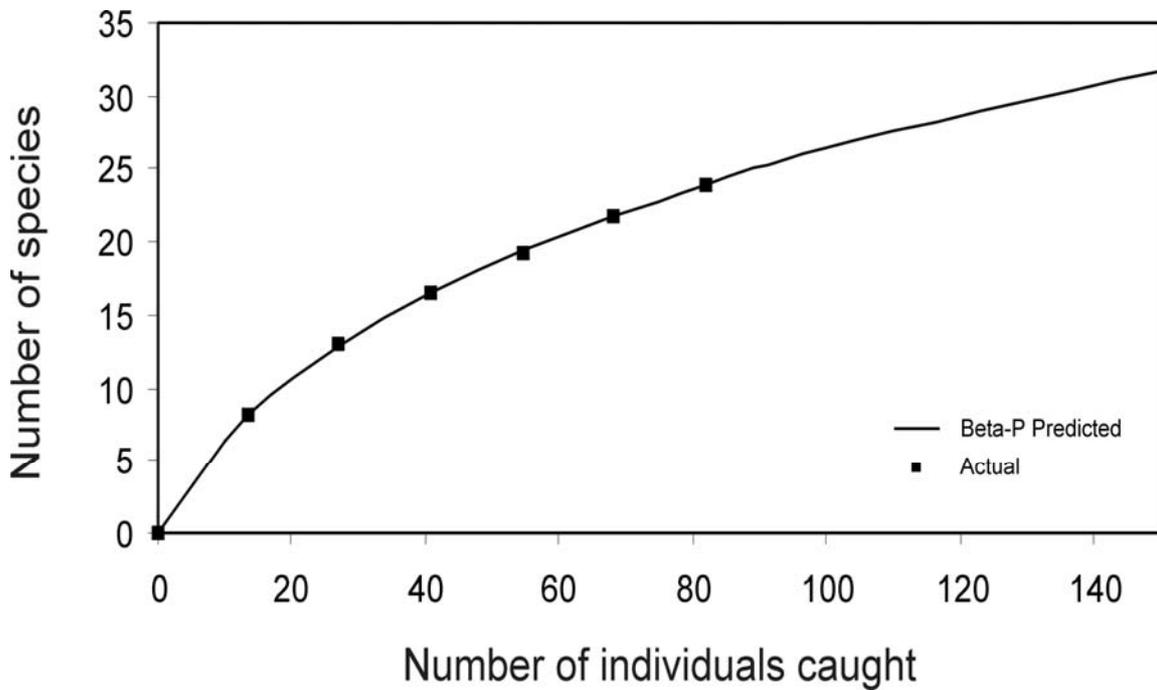


Plate 2 Averaged Species Accumulation Curve for Reptiles

APPENDICES

APPENDIX 1

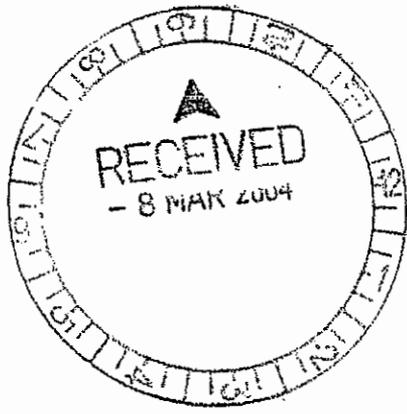
RESULTS OF CALM FAUNA DATABASE SEARCH AND FAUNA LICENCE

MGM/2004/002 FAU



DEPARTMENT OF
Conservation
AND LAND MANAGEMENT
Conserving the nature of WA

Your Ref:
Our Ref: 2001F001096V06
Enquires: Peter Orell
Phone: (08) 9334 0454
Fax: (08) 9334 0278
Email: petero@calm.wa.gov.au



Mr Scott Thompson
ATA Environmental
Dilhorn House
2 Bulwer Street
PERTH WA 6000

Dear Mr Thompson

REQUEST FOR THREATENED FAUNA INFORMATION

I refer to your request of 2 March for information on threatened fauna occurring in the Mt Gibson area.

A search was undertaken for this area of the Department's Threatened Fauna database, which includes species which are declared as '*Rare or likely to become extinct* (Schedule 1)', '*Birds protected under an international agreement* (Schedule 3)', and '*Other specially protected fauna* (Schedule 4)'. Attached are print outs from these databases where records were found.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the sixth point that refers to the requirement to undertake field investigations for the accurate determination of threatened fauna occurrence at a site. The information supplied should be regarded as an indication only of the threatened fauna that may be present.

An invoice for \$110.00 (includes GST), being the set charge for the supply of this information, will be forwarded. Please note that the standard fee will increase to \$165.00 (including GST) as of 1 April 2004.

It would be appreciated if any populations of threatened fauna encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss threatened fauna management, please contact my Senior Zoologist, Dr Peter Mawson on 08 93340421.

Yours sincerely

for Keiran McNamara
EXECUTIVE DIRECTOR

4 March 2004

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

THREATENED FAUNA INFORMATION

Conditions In Respect Of Supply Of Information

- * All requests for data to be made in writing to the Executive Director, Department of Conservation and Land Management, Attention: Senior Zoologist, Wildlife Branch.
- * The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided without the prior consent of the Executive Director, Department of Conservation and Land Management.
- * Specific locality information for Threatened Fauna is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for Threatened Fauna may not be used in reports without the written permission of the Executive Director, Department of Conservation and Land Management. Reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Senior Zoologist is to be contacted for guidance on the presentation of Threatened Fauna information.
- * Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data, they may be present. The Department of Conservation and Land Management accepts no responsibility for this.
- * Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
- * It should be noted that the supplied data do not necessarily represent a comprehensive listing of the Threatened Fauna of the area in question. Its comprehensiveness is dependent of the amount of survey carried out within a specified area. The receiving organisation should employ a biologist/zoologist, if required, to undertake a survey of the area under consideration.
- * Acknowledgment of the Department of Conservation and Land Management as the source of data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Conservation and Land Management, Attention; Senior Zoologist, Wildlife Branch.

APPENDIX 2

**SPECIES OF BIRDS PREDICTED TO OCCUR
AND RECORDED BY ATA ENVIRONMENTAL,
AND VARIOUS OTHER SURVEYS IN THE
REGION**

APPENDIX 2
SPECIES OF BIRD PREDICTED TO OCCUR AND RECORDED BY ATA ENVIRONMENTAL AND VARIOUS OTHER SURVEYS IN THE REGION

X represents bird that were present during the survey period.
 * represents an introduced species
 E represents species listed under the *Environment Protection and Biodiversity Conservation Act 1999*
 EM represents migratory bird species listed under the *Environment Protection and Biodiversity Conservation Act 1999*
 S represents species listed on the Department of Conservation and Land Management's Scheduled Fauna list
 P represents species listed on the Department of Conservation and Land Management's Priority Fauna list
 NR Not resident
 R Resident

Predicted Species	ATA Environmental		Prof. Harry Recher		Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
	Recorded	Abundance	Recorded	Abundance								
Acanthizidae (Thornbills, Gerygones, Whitefaces, Wrens)												
Inland Thornbill <i>Acanthiza apicalis</i>	X	100+	R	1000+	X	X	X	X	X	X	X	X
Yellow-rumped Thornbill <i>Acanthiza chrysorrhoa</i>	X	10-100	R	100-1000	X	X	X	X	X	X	X	X
Chestnut-tailed Thornbill <i>Acanthiza uropygialis</i>	X	100+	R	1000+	X	X	X	X	X	X	X	X
Slaty-backed Thornbill <i>Acanthiza robustirostris</i>	X	100+					X	X				
Southern Whiteface <i>Aphelocephala leucopsis</i>	X	1-10	R	10-100	X	X		X	X		X	X
Western Gerygone <i>Gerygone fusca</i>	X	1-10					X	X				
Shy Groundwren/Heathwren <i>Hylacola cauta</i>								X				
Redthroat <i>Pyrrholaemus brunneus</i>	X	10-100	R	100-1000	X	X	X	X	X	X	X	X
White-browed Scrubwren <i>Sericornis frontalis</i>												
Weebill <i>Smicronis brevirostris</i>	X	100+	R	1000+	X	X	X	X		X	X	X
Striated Fieldwren <i>Calamanthus fuliginosus</i>											X	
Accipitridae (Eagles, Kites, Hawks, Bustards)												
Brown Goshawk <i>Accipiter fasciatus</i> EM	X	1-10	R	1-10	X		X	X			X	
Collared Sparrowhawk <i>Accipiter cirrhocephalus cirrhocephalus</i> EM								X	X			
Wedge-tailed Eagle <i>Aquila audax audax</i> EM			R	10-100	X	X	X	X		X	X	X
Little Eagle <i>Aquila morphnoides</i> EM			R	1-10							X	
Spotted Harrier <i>Circus assimilis</i> EM					X							X
Black-shouldered Kite <i>Elanus axillaris</i> EM							X					
White-breasted Sea Eagle <i>Haliastur leucogaster</i> EM												
Whistling Kite <i>Haliastur sphenurus</i> EM			R	1-10								
Square-tailed Kite <i>Lophoictinia isura</i> EM			R	1-10								
Aegothelidae (Owlet-nightjars)												
Australian Owlet-nightjar <i>Aegotheles cristatus cristatus</i>	X	1-10				X	X		X	X	X	X
Anatidae (Ducks, geese, swans)												
Grey Teal <i>Anas gracilis gracilis</i> EM						X						X
Pacific Black Duck <i>Anas superciliosa</i> EM			NR	1-10		X						X
Australian Wood Duck <i>Chenonetta jubata</i> EM								X				
Freckled Duck <i>Stictonetta naevosa</i> EM												
Australian Shelduck <i>Tadorna tadornoides</i> EM					X	X		X				X
Ardeidae (Hérons, Egrets, Bitterns)												
White-faced Heron <i>Ardea novaehollandiae novaehollandiae</i>									X			X
White-necked Heron <i>Ardea pacifica</i>			NR	1-10			X					

Predicted Species	ATA Environmental		Prof. Harry Recher		Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
	Recorded	Abundance	Recorded	Abundance								
Australian Magpie Grey Butcherbird Grey Currawong	<i>Cracticus tibicen</i> <i>Cracticus torquatus torquatus</i> <i>Strepera versicolor</i>	X X X	1-10 1-10 1-10	R R R	1-10 10-100 10-100	X	X X	X X X	X X X	X X X	X X X	X X X
Cuculidae (Cuckoos) Horsfield's Bronze Cuckoo Shining Bronze-Cuckoo Black-eared Cuckoo Pallid Cuckoo	<i>Chrysococcyx basalis</i> <i>Chrysococcyx lucidus</i> <i>Chrysococcyx osculans</i> <i>Cuculus pallidus</i>	X X X X	1-10 1-10 1-10 1-10	R NR R NR	10-100 1-10 1-10 1-10			X X	X X	X X	X X	X X
Dicaeidae (Mistletoes) Mistletoebird	<i>Dicaeum hirundinaceum hirundinaceum</i>	X	10-100	R	10-100			X	X			X
Dicruridae (Drongos, Fantails, Willie Wagtails, Flycatchers) Magpie Lark Grey Fantail Willie Wagtail	<i>Grallina cyanoleuca</i> <i>Rhipidura fuliginosa</i> <i>Rhipidura leucophrys leucophrys</i>	X X X	10-100 1-10 10-100	R R R	1-10 10-100 100-1000	X X X	X X X	X X X	X X X		X X X	X X X
Falconidae (Falcons, Hobbys, Kestrels) Brown Falcon Australian Hobby Peregrine Falcon Nankeen Kestrel	<i>Falco berigora berigora</i> <i>Falco longipennis</i> <i>Falco peregrinus</i> <i>Falco cenchroides cenchroides</i>	X X X X	1-10 1-10 1-10 1-10	R R R R	1-10 1-10 1-10 1-10	X X X	X X X	X X X	X X X		X X X X	X X X X
Halcyonidae (Wood Kingfishers, Kookaburras) Red-backed Kingfisher Sacred Kingfisher	<i>Todiramphus pyrrhopygia</i> <i>Todiramphus sanctus sanctus</i>			NR	1-10			X			X	X
Hirundinidae (Swallows, Martins) Fairy Martin Tree Martin Welcome Swallow White-backed Swallow	<i>Petrochelidon ariel</i> <i>Petrochelidon nigricans nigricans</i> <i>Hirundo neoxena</i> <i>Cheramoeca leucosternus</i>	X X X X	100+ 10-100	R R	1000+ 10-100	X X	X X	X X	X X		X X X	X X X X
Loridae (Lorikeets) Purple Crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>			NR	10-1000+			X				
Maluridae (Emu-wrens, Fairy-wrens, Grass-wrens) Blue-breasted Fairy Wren Splendid Fairy-wren Variegated Fairy-wren White-winged Fairy-wren	<i>Malurus pulcherrimus</i> <i>Malurus splendens splendens</i> <i>Malurus lamberti lamberti</i> <i>Malurus leucopterus leucopterus</i>	X X X X	1-10 1-10	R	100-1000	X X X	X X	X X	X X	X X	X X	X X X X
Megapodiidae (Malleefowl, Scrubfowl) Malleefowl	<i>Leipoa ocellata</i> E S	X	1-10	R	10-100		X	X	X		X	X
Meliphagidae (Honeyeaters, Chats, Friarbirds) Spiny-cheeked Honeyeater Red Wattlebird	<i>Acanthagenys rufogularis</i> <i>Anthochaera carunculata</i>	X X	100+ 1000+	R R	100-1000 1000+	X	X	X X	X X	X X	X X	X X

Predicted Species	ATA Environmental		Prof. Harry Recher		Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
	Recorded	Abundance	Recorded	Abundance								
Pied Honeyeater	<i>Certhionyx variegatus</i>	X	1-10			X			X			
Black Honeyeater	<i>Certhionyx pectoralis</i>					X						
Orange Chat	<i>Epthianura aurifrons</i>					X						
Crimson Chat	<i>Epthianura tricolor</i>					X						
White-fronted Chat	<i>Epthianura albifrons</i>									X	X	
White-eared Honeyeater	<i>Lichenostomus leucotis leucotis</i>	X	10-100	R	10-100	X		X	X			
Yellow-plumed Honeyeater	<i>Lichenostomus ornatus</i>	X	1-10					X				
Grey-fronted Honeyeater	<i>Lichenostomus plumulus</i>	X	100+	R	1000+			X				
Singing Honeyeater	<i>Lichenostomus virescens</i>	X	100+	R	1-10	X	X	X	X	X	X	X
Brown Honeyeater	<i>Lichmera indistincta indistincta</i>	X	10-100	R	1000+		X	X	X			X
Yellow-throated (White-rumped) Miner	<i>Manorina flavigula</i>	X	100+	R	100-1000	X	X	X	X	X	X	X
White-fronted Honeyeater	<i>Melithreptus brevirostris leucogenys</i>	X	10-100	R	1000+	X		X				X
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	X	10-100	R	100-1000			X			X	X
	<i>Phylidonyris albifrons</i>											
Meropidae (Bee-eaters)												
Rainbow Bee-eater	<i>Merops ornatus</i> EM	X	100+	NR	1-10	X		X	X	X	X	X
Motacillidae (Pipits, True Wagtails)												
Richard's Pipit	<i>Anthus novaeseelandiae</i>	X	10-100			X	X		X	X	X	X
Neosittidae (Sittellas)												
Varied Sittella	<i>Daphoenositta chrysoptera</i>	X	1-10	R	10-100			X				
Orthonychidae (Whipbirds and Logrunners)												
Chiming Wedgebill	<i>Psophodes occidentalis</i>			R	1-10							
Otididae (Bustards)												
Australian Bustard	<i>Ardeotis australis</i>										X	
Pachycephalidae (Bellbirds, Shrike-thrushes, Whistlers)												
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	X	10-100	R	100-1000	X	X	X	X	X	X	X
Crested Bellbird	<i>Oreoica gutturalis</i>	X	10-100	R	1-10						X	
Rufous Whistler	<i>Pachycephala rufiventris rufiventris</i>	X	100+	R	100-1000	X	X	X	X	X	X	X
Golden Whistler	<i>Pachycephala pectoralis pectoralis</i>			R	1-10	X		X	X	X	X	X
Pardalotidae (Pardalotes)												
Striated Pardalote	<i>Pardalotus striatus</i>	X	100+	R	1000+	X	X	X	X		X	X
Passeridae (Finches, Sparrows)												
Zebra Finch	<i>Taeniopygia guttata</i>	X	10-100	NR	1-10	X	X		X	X		X
Petroicidae (Flycatchers, Robins)												
Southern Scrub-robin	<i>Drymodes brunneopygia</i>	X	10-100				X	X	X			X
Western Yellow Robin	<i>Eopsaltria australis griseogularis</i>	X	10-100			X	X	X		X		X
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	X	1-10									
Jacky Winter	<i>Microeca fascians assimilis</i>	X	1-10	R	10-100			X			X	
Red-capped Robin	<i>Petroica goodenovii</i>	X	100+	R	1000+	X		X	X	X	X	X
Scarlet Robin	<i>Petroica multicolor</i>									X		

Predicted Species	ATA Environmental		Prof. Harry Recher		Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
	Recorded	Abundance	Recorded	Abundance								
Tytonidae (Owls) Barn Owl <i>Tyto alba</i> <i>Tyto alba delicatula</i>												
Zosteropidae (White-eyes) Silveryeye <i>Zosterops lateralis gouldi</i>									X			

APPENDIX 3

BIRD SPECIES RECORDED IN DIFFERENT HABITATS AT MOUNT GIBSON BY ATA ENVIRONMENTAL

APPENDIX 3
BIRD SPECIES RECORDED IN DIFFERENT HABITATS AT MOUNT GIBSON BY ATA ENVIRONMENTAL

- X represents bird that were present during the survey period.
 * represents an introduced species
 E represents species listed under the *Environment Protection and Biodiversity Conservation Act 1999*
 EM represents migratory bird species listed under the *Environment Protection and Biodiversity Conservation Act 1999*
 S represents species listed on the Department of Conservation and Land Management's Scheduled Fauna list
 P represents species listed on the Department of Conservation and Land Management's Priority Fauna list

Predicted Species	Mallee	Thicket	Woodland	Burnt	Iron Stone Range	Salt Lake
Acanthizidae (Thornbills, Gerygones, Whitefaces, Wrens)						
Inland Thornbill	X	X	X	X	X	
Yellow-rumped Thornbill	X	X	X	X		
Chestnut-tailed Thornbill	X	X	X	X		
Slaty-backed Thornbill	X	X	X	X		
Southern Whiteface						
Western Gerygone		X	X			
Redthroat		X	X			
Weebill	X	X	X	X		X
Accipitridae (Eagles, Kites, Hawks, Bustards)						
Brown Goshawk			X			
Aegothelidae (Owlet-nightjars)						
Australian Owlet-nightjar			X			
Artamidae (Woodswallows)						
Black-faced Woodswallow			X		X	
Masked Woodswallow			X		X	

Predicted Species	Mallee	Thicket	Woodland	Burnt	Iron Stone Range	Salt Lake
Campephagidae (Cuckoo-shrikes, Cicadabirds, Trillers) Black-faced Cuckoo-shrike White-winged Triller	X X		X X			
Casuariidae (Emus) Emu	X		X			
Caprimulgidae (Nightjars) Spotted Nightjar	X	X	X	X	X	
Cinclosomatidae (Quail-thrushes, whipbirds) Chestnut Quail-thrush Chestnut-breasted Quail-thrush					X	
Climacteridae (Trecreepers) Rufous Trecreeper						
Columbidae (Doves, Pigeons) Crested Pigeon Common Bronzewing	X X		X			
Corvidae (Crows, Ravens) Australian Raven	X	X	X	X	X	
Cracticidae (Magpies, Currawongs, Butcherbirds) Pied Butcherbird Grey Butcherbird Grey Currawong	X X	X	X X X			
Cuculidae (Cuckoos) Horsfield's Bronze Cuckoo Black-eared Cuckoo			X X			

Predicted Species	Mallee	Thicket	Woodland	Burnt	Iron Stone Range	Salt Lake
Dicaeidae (Mistletoes) Mistletoebird <i>Dicaeum hirundinaceum hirundinaceum</i>	X		X			
Dicruridae (Drongos, Fantails, Willie Wagtails, Flycatchers) Magpie Lark Grey Fantail Willie Wagtail <i>Grallina cyanoleuca</i> <i>Rhipidura fuliginosa</i> <i>Rhipidura leucophrys leucophrys</i>	X X	X	X X	X		
Falconidae (Falcons, Hobbys, Kestrels) Brown Falcon <i>Falco berigora berigora</i>			X			
Hirundinidae (Swallows, Martins) Tree Martin Welcome Swallow <i>Petrochelidon nigricans nigricans</i> <i>Hirundo neoxena</i>	X	X	X X			
Maluridae (Emu-wrens, Fairy-wrens, Grass-wrens) Splendid Fairy-wren White-winged Fairy-wren <i>Malurus splendens splendens</i> <i>Malurus leucopterus leucopterus</i>			X	X		
Megapodiidae (Malleefowl, Scrubfowl) Malleefowl <i>Leipoa ocellata</i> E S		X	X			
Meliphagidae (Honeyeaters, Chats, Friarbirds) Spiny-cheeked Honeyeater Pied Honeyeater White-eared Honeyeater Yellow-plumed Honeyeater Grey-fronted Honeyeater Singing Honeyeater Brown Honeyeater Yellow-throated (White-rumped) Miner White-fronted Honeyeater <i>Acanthagenys rufogularis</i> <i>Certhionyx variegatus</i> <i>Lichenostomus leucotis leucotis</i> <i>Lichenostomus plumulus</i> <i>Lichenostomus virescens</i> <i>Lichmera indistincta indistincta</i> <i>Manorina flavigula</i> <i>Melithreptus brevirostris leucogenys</i>	X X X X X X X	X X X X X	X X X X X X X		X	

Predicted Species	Mallee	Thicket	Woodland	Burnt	Iron Stone Range	Salt Lake
Brown-headed Honeyeater	X		X			
<i>Meliphreptus brevirostris</i> <i>Phylidonyris albifrons</i>						
Meropidae (Bee-eaters) Rainbow Bee-eater	X	X	X	X	X	
<i>Merops ornatus</i> EM						
Motacillidae (Pipits, True Wagtails) Richard's Pipit				X		X
<i>Anthus novaeseelandiae</i>						
Neositidae (Sitellas) Varied Sittella	X		X			
<i>Daphoenositta chrysoptera</i>						
Pachycephalidae (Bellbirds, Shrike-thrushes, Whistlers) Grey Shrike-thrush Crested Bellbird Rufous Whistler	X X X		X X X			
<i>Colluricincla harmonica</i> <i>Oreoica gutturalis</i> <i>Pachycephala rufiventris rufiventris</i>		X				
Pardalotidae (Pardalotes) Striated Pardalote	X		X			
<i>Pardalotus striatus</i>						
Passeridae (Finches, Sparrows) Zebra Finch	X		X			
<i>Taeniopygia guttata</i>						
Petroicidae (Flycatchers, Robins) Southern Scrub-robin Western Yellow Robin Hooded Robin Jacky Winter Red-capped Robin	X X X X	X X X	X X X	X		
<i>Drymodes brunneopygia</i> <i>Eopsaltria australis griseogularis</i> <i>Melanodryas cucullata cucullata</i> <i>Microeca fascians assimilis</i> <i>Petroica goodenovii</i>						
Podargidae (Frogmouths) Tawny Frogmouth	X		X			
<i>Podargus strigoides</i>						

Predicted Species	Mallee	Thicket	Woodland	Burnt	Iron Stone Range	Salt Lake
Pomotostomidae (Babblers) White-browed Babbler	X	X	X			
Psittacidae (Pittas) Galah Little Corella Australian Ringneck	X X X	X	X X X	X		
Strigidae (Owls, Hawk-owls) Boobook Owl	X		X			

APPENDIX 4

**SPECIES OF REPTILE PREDICTED TO OCCUR
AND RECORDED AT MOUNT GIBSON FOR
EACH TRAPPING SITE**

Predicted Species	Sites / Number of Captures per Species											
	1	2	3	4	5	6	7	8	9	10	11	Opp
Boidae (Pythons) Stimson's Python Woma Python												
<i>Antaresia stimsoni stimsoni</i> <i>Aspidites ramsayi</i> S												
Elapidae (Elapid snakes) Desert Death Adder Southern Shovel-nosed Snake Yellow-faced Whipsnake Gould's snake Monk Snake Mulga Snake Ringed Brown snake Gwardar Jan's Banded Snake Rosen's Snake			1								1	
<i>Acanthophis pyrrhus</i> <i>Brachyurophis semifasciata</i> <i>Demansia psammophis reticulata</i> <i>Parasuta gouldii</i> <i>Parasuta monachus</i> <i>Pseudechis australis</i> <i>Pseudonaja modesta</i> <i>Pseudonaja nuchalis</i> <i>Simoselaps bertholdi</i> <i>Suta fasciata</i>												2
						2						1
												1
												1
												1
												2
Gekkonidae (Geckoes)												
<i>Crenadactylus ocellatus ocellatus</i> <i>Diplodactylus granariensis</i> <i>Diplodactylus maini</i> <i>Diplodactylus ornatus</i> <i>Diplodactylus pulcher</i> <i>Diplodactylus squarrosus</i> <i>Gehyra variegata</i> <i>Heteronotia binoei</i> <i>Nephurus vertebralis</i> <i>Oedura reticulata</i> <i>Rhynchoedura ornata</i> <i>Strophurus assimilis</i> <i>Strophurus michaelsoni</i> <i>Strophurus strophurus</i> <i>Underwoodisaurus milii</i>		1				2						1
									1			3
		2				1					2	17
						1					6	17
						1		1			17	18
		1				1					14	2
						1					2	1

Predicted Species	Sites / Number of Captures per Species											
	1	2	3	4	5	6	7	8	9	10	11	Opp
Varanidae (Monitors and goannas)												
<i>Varanus caudolineatus</i>												1
<i>Varanus gouldii</i>												1
<i>Varanus panoptes</i>							Scr		Scr			1
<i>Varanus tristis</i>							Scr		I			1

APPENDIX 5

**SPECIES OF MAMMAL PREDICTED TO OCCUR
AND RECORDED AT MOUNT GIBSON FOR
EACH TRAPPING SITE**

APPENDIX 6

**REPTILE AND AMPHIBIAN SPECIES
PREDICTED TO OCCUR AND RECORDED
DURING ATA ENVIRONMENTAL'S MARCH 2004
SURVEY AND OTHER SURVEYS IN THE
REGION**

	ATA 2004 survey	Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Mt Gibson (ATA Environmental March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
Typhlopidae (Blind snakes) <i>Ramphotyphlops hamatus</i> <i>Ramphotyphlops waitii</i>							X X	X	X	
Varanidae (Monitors and goannas) <i>Varanus caudolineatus</i> <i>Varanus giganteus</i> <i>Varanus gouldii</i> <i>Varanus panoptes</i> <i>Varanus tristis</i>	1 1 1 2	3 X 		X X X	X X X	 X 	 X 	X X X	X X 	 X X X

APPENDIX 7

**MAMMAL SPECIES PREDICTED TO OCCUR
AND RECORDED DURING
ATA ENVIRONMENTAL'S MARCH 2004
SURVEY AND OTHER SURVEYS
IN THE REGION**

APPENDIX 7

MAMMAL SPECIES PREDICTED TO OCCUR AND RECORDED DURING ATA ENVIRONMENTAL'S MARCH 2004 SURVEY AND OTHER SURVEYS IN THE REGION

* represents introduced or feral species.
 X represents species that were recorded during the survey period

	ATA 2004 survey	Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Mt Gibson (ATA Environmental March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
Bovidae (Goats, cow)										
Goat <i>Capra hircus</i> *	X	X	X	X	X	X	X	X		X
Cow <i>Bos taurus</i> *									X	
Sheep <i>Ovis aries</i> *									X	
Canidae (Dingos, Dogs)										
Fox <i>Vulpes vulpes</i> *	X	1	X	X	X	X	X	X	X	X
Dingo <i>Canis lupus</i>							X			
Dasyuridae (Dunnarts, Quoll, Mardo, Wambengers)										
Kultarr <i>Antechinomys laniger</i>							X			
Fat-tailed Dunnart <i>Sminthopsis crassicaudata</i>							X			
Little long-tailed Dunnart <i>Sminthopsis dolichura</i>	X	2		X	X	X	X	X		
Gilbert's Dunnart <i>Sminthopsis gilberti</i>									X	
White-tailed Dunnart <i>Sminthopsis granulipes</i>									X	
Grey-bellied Dunnart <i>Sminthopsis griseoventer griseoventer</i>										
Equidae (Horse)										
Horse <i>Equus equus</i> *									X	
Felidae (Cat)										
Cat <i>Felis catus</i> *	X	2	X	X	X	X	X	X		X
Leporidae (Rabbits and hares)										
Rabbit <i>Oryctolagus cuniculus</i> *	X	25	X	X	X	X	X	X	X	X
Macropodidae (Wallabies, Kangaroos)										
Western Grey Kangaroo <i>Macropus fuliginosus</i>	X	2		X	X	X	X			X
Biggada (Euro) <i>Macropus robustus erubescens</i>	X	2	X	X	X	X	X	X	X	X
Red Kangaroo <i>Macropus rufus</i>	X	2		X	X	X	X	X	X	
Molossidae (Free-tail Bats)										
Southern Free-tail Bat <i>Mormopterus planiceps</i>										
White-striped Free-tail Bat <i>Tadarida australis</i>			X				X	X	X	X
Muridae (Rodents)										
House Mouse <i>Mus musculus</i> *	X	1	X	X	X	X	X		X	X
Mitchell's Hopping Mouse <i>Notomys mitchellii</i>								X	X	
Bolam's Mouse <i>Pseudomys bolami</i>										
Sandy Inland Mouse <i>Pseudomys hermannsburgensis</i>			X						X	
Black Rat <i>Rattus rattus</i>		1								X
Emballonuridae (Sheath-tail Bats)										
Hill's Sheath-tail Bat <i>Taphozous hilli</i>							X			

	ATA 2004 survey	Koolanooka (ATA Environmental, December 2003)	Koolanooka (Alan Tingay & Associates 1996)	Koolanooka South (ATA Environmental, March 2004)	Mt Gibson (ATA Environmental March 2004)	Hart, Simpson and Associates, (Mount Gibson, 2003)	Tallering Peak (Bamford, et al. 2003)	Blue Hills (Bamford, et al. 2004)	White Well (Burbidge, et al. 1989)	Yandanooka (Dell, 1996a; b)
Tachyglossidae (Echidna) Echidna <i>Tachyglossus aculeatus</i>	X	X	X	X	X	X	X	X	X	X
Vespertilionidae (Evening Bats) Gould's Wattled Bat <i>Chalinolobus gouldii</i> Chocolate Wattled Bat <i>Chalinolobus morio</i> Lesser Long-eared Bat <i>Nyctophilus geoffroyi</i> Greater Long-eared Bat <i>Nyctophilus timoriensis</i> Inland Broad-nosed Bat <i>Scotorepens balstoni</i> Inland Forest Bat <i>Vespadelus baverstocki</i> Finlayson's Cave Bat <i>Vespadelus finlaysoni</i> Southern Forest Bat <i>Vespadelus regulus</i>		25	X			X	X X X X X	X X X X X	X	X

APPENDIX 8

DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE *WA WILDLIFE CONSERVATION ACT 1950*.

APPENDIX 8
DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE *WA WILDLIFE*
CONSERVATION ACT 1950

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

Classification of rare and endangered fauna under the Wildlife Conservation (Specially Protected Fauna) Notice 1998 recognises four schedules of taxa. These are;

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

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

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

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

In addition to the above classification, CALM also classify fauna under four different Priority codes:

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

Priority two – *Taxa with few, poorly known populations on conservation lands, or taxa with several, poorly known populations not on conservation lands.* Taxa which are known from few specimens or sight records from one or a few localities on lands no under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

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

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

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