

**Significant Fauna Survey of the Hinge Haul Road:
November 2012**



Ctenophorus scutulatus at Hinge Haul Road survey area (Photo: G. Basnett)

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20th April 2013

EXECUTIVE SUMMARY

Karara Mining Limited (KML) is considering haul route options for transporting iron ore from the Hinge area. Bamford Consulting Ecologists was commissioned to conduct a conservation significant fauna survey for the proposed haul route (survey area). The key significant fauna species targeted (those regularly recorded in the general region and of high significance) were the Shield-backed Trapdoor Spider *Idiosoma nigrum*, the Malleefowl *Leipoa ocellata* and the Western Spiny-tailed Skink *Egernia stokesii badia*. Habitat assessments were also made for the Gilled Slender Bluetongue, Major Mitchell's Cockatoo and SRE invertebrates. The objectives of the survey were to determine the presence or absence of conservation significant fauna in the survey area, and assess the habitat suitability for these species.

The survey was conducted from 26th September to 3rd October and 20th to 23rd November 2012. The survey area was systematically searched by two to five personnel walking in parallel lines spaced 20 to 50 m apart. Surveys for the Shield-backed Trapdoor Spider were conducted approximately every 500 m (less frequently in unsuitable habitat) with 10 m by 10 m quadrats searched for ten minutes. While walking, the area was searched for Malleefowl mounds and tracks. Logs within patches of Eucalypt woodland were searched for scats of the Western Spiny-tailed Skink. Habitat suitability for each species was assessed.

Shield-backed Trapdoor Spider

A total of 18 spider quadrats was surveyed, with 6 quadrats containing spider burrows and 33 spider burrows recorded. The majority of the spiders were located in the southernmost 2km of the survey area. The habitat of much of the central 6km was not generally considered ideal for the spider, with much of the project area located on plains, however two spiders were located in a small patch of suitable habitat. The remaining 3km in the northern part of the survey area were more suitable, with some

areas of Acacia on loam with cobbles and gravel on the lower slopes of small ironstone ridges, however spiders were only located in one quadrat in this area.

Five of the nine quadrats in the southernmost section of the survey area had spiders, and 24 of the 33 active spider burrows recorded throughout the survey were in this area. It may be possible to minimise impact in the southernmost part of the survey area.

Malleefowl

The survey area represents suitable habitat for the Malleefowl, particularly at the southern end of the alignment and around the northern end in the Hinge area. No active Malleefowl mounds were recorded, although very old and degraded mounds were found. There may be an issue of roadkill if individuals are active in the area.

Western Spiny-tailed Skink

There is little suitable habitat for the Western Spiny-tailed Skink in the survey area. There are some marginal patches of Eucalypt woodland with a few logs but most logs are too small, termite-infested or filled with mud. Although no skinks were recorded in the survey area it does not rule out the possibility of their presence. Avoiding disturbance of large Eucalyptus trees and logs will minimise impact on this species.

Major Mitchell's Cockatoo

While Major Mitchell's Cockatoo could occur anywhere in the project area, there was very little habitat suitable for breeding. The species requires large hollows and there were few large trees, none with obvious large hollows, along the alignment.

Gilled Slender Bluetongue

Based on the few previous records of this species in the KIOP area, the only suitable habitat along the Hinge haul road was on low hills in the north and south of the alignment.

SRE Invertebrates

The most suitable environments for potential SRE invertebrates in the project area occur in the north and south of the alignment, where low hills may provide the sort of isolated mesic refugia that can support such species.

Conclusions

Two significant fauna species were confirmed as present in the project area: the Shield-backed Trapdoor Spider and Malleefowl. Other significant species were not recorded and there is little if any suitable habitat for the Western Spiny-tailed Skink and Major Mitchell's Cockatoo. Low hills with gravelly loam soils and some exposed rock in the south and north of the project area provide suitable habitat for and were found to support the Shield-backed Trapdoor Spider and Malleefowl, and may also be suitable for the Gilled Slender Bluetongue and SRE invertebrates. Habitat loss from development of the haul road would be limited in extent, but the risk of roadkill to Malleefowl will need to be considered.

CONTENTS

1	INTRODUCTION	5
1.1	Introduction	5
1.2	Study Objectives	5
1.3	Survey Area	6
2	METHODS.....	8
2.1	Survey Dates and Personnel	8
2.2	Survey Methods	8
3	RESULTS	9
3.1	Shield-backed Trapdoor Spider	9
3.2	Malleefowl	13
3.3	Western Spiny-tailed Skink	14
3.4	Major Mitchell's Cockatoo	15
3.5	Gilled Slender Bluetongue	15
3.6	SRE Invertebrates	16
4	DISCUSSION.....	16

1 INTRODUCTION

1.1 Introduction

Karara Mining Limited (KML) has received approval for its Karara Iron Ore Project (KIOP) located on Karara Station, 55km north-east of Perenjori, and has commenced mining. In expansion plans for the project, KML is investigating a deposit in the Hinge area, and is considering haul route options for transporting iron ore from this site. As part of this process, Bamford Consulting Ecologists (BCE) was commissioned to conduct investigations into the presence of conservation significant species in the proposed haul route or Hinge Haul Road survey area. Species of interest were the Shield-backed Trapdoor Spider *Idiosoma nigrum*, Malleefowl *Leipoa ocellata* and the Western Spiny-tailed Skink *Egernia stokesii badia*. These are all of high conservation significance: the Shield-backed Trapdoor Spider, Malleefowl and Western Spiny-tailed Skink are listed under Schedule 1 of the WA *Wildlife Conservation Act 1950*, with the Malleefowl listed as Vulnerable and the Skink listed as Endangered under the federal *Environment Protection and Biodiversity Conservation Act (1999)*. Habitat assessment for the Gilled Slender Bluetongue *Cyclodomorphus branchialis* (Schedule 1 of the WA *Wildlife Conservation Act 1950* and Major Mitchell's Cockatoo *Cacatua leadbeateri* (Schedule 4 of the WA *Wildlife Conservation Act 1950*) were also made.

1.2 Study Objectives

Objectives of studies in the survey area were to:

- 1) Determine presence or absence of the Shield-backed Trapdoor Spider;
- 2) Record active Malleefowl mounds;
- 3) Identify existing colonies of the Spiny-tailed Skink; and
- 4) Assess habitat suitability for the above species in the survey area.

In addition, opportunistic observations were made on other fauna.

1.3 Survey Area

The survey area extends south from the Hinge area and is *ca.* 11km long and 100m wide (Figure 1). The environment is mostly mixed Acacia with occasional eucalypts over loam on the plains, with some mixed Acacia over loam with cobbles and gravel on the slopes.



Figure 1. Location of Hinge Haul Road survey area (blue), Hinge area is also shown (green).

2 METHODS

2.1 Survey Dates and Personnel

The Hinge Haul Road survey area was surveyed from 26th September to 3rd October and 20th to 23rd November 2012. Field work personnel included:

- Dr Mike Bamford (BSc Biol., Hons Biol., PhD Biol.)
- Mr Jeff Turpin (BSc. Zool.)
- Mr Peter Smith (Dip Ag.)
- Mrs Sarah Smith (BSc. Biol.)
- Ms Gillian Basnett (BSc. Hons. MSc.)
- Ms Katherine Chuk (BSc. Hons. Zool.)

2.2 Survey Methods

The survey area was systematically searched by two to five personnel walking in parallel lines spaced 20-50 m apart. Surveys for the Shield-backed Trapdoor Spider were conducted approximately every 500m (less frequently in unsuitable habitat but more closely-spaced in suitable habitat see Figure 2), with 10m by 10m quadrats searched for ten minutes. Opportunistic records of spiders were also made. Where habitat was unsuitable for spiders, description points were established so that the environment in this area was recorded. A description of each quadrat was made including soil, vegetation and position in landscape. While walking, the area was searched for Malleefowl mounds and tracks. Logs within patches of Eucalypt woodland were searched for scats of the Western Spiny-tailed Skink. Habitat suitability for each species was assessed throughout the length of the alignment.

3 RESULTS

3.1 Shield-backed Trapdoor Spider

A total of 18 quadrats was surveyed, with 6 quadrats containing spider burrows and 33 active spider burrows recorded (Appendix 1). The majority of the spiders were located in the southernmost 2km of the survey area (Figures 2a & 2b). The habitat of much of the central 6km was not generally considered ideal for the spider (Appendix 3), with much of the project area located on plains (Figure 3), however two spiders were located in a small patch of suitable habitat within this central section. The remaining 3km in the northern part of the survey area were more suitable for the species, with some areas of Acacia on loam with cobbles and gravel on the lower slopes of small ironstone ridges (Figure 4); however spiders were only located in one quadrat in this area.

In general, the survey area did not represent suitable spider habitat, with Acacia shrubs on clayey loam and on the plains. However, the southernmost section of the survey area represents suitable habitat for the spider, with 5 out of 9 quadrats recording spiders, and though few spiders were found, the northernmost part of the survey area may also be suitable. It may be possible to minimise impact in the southernmost part of the survey area.

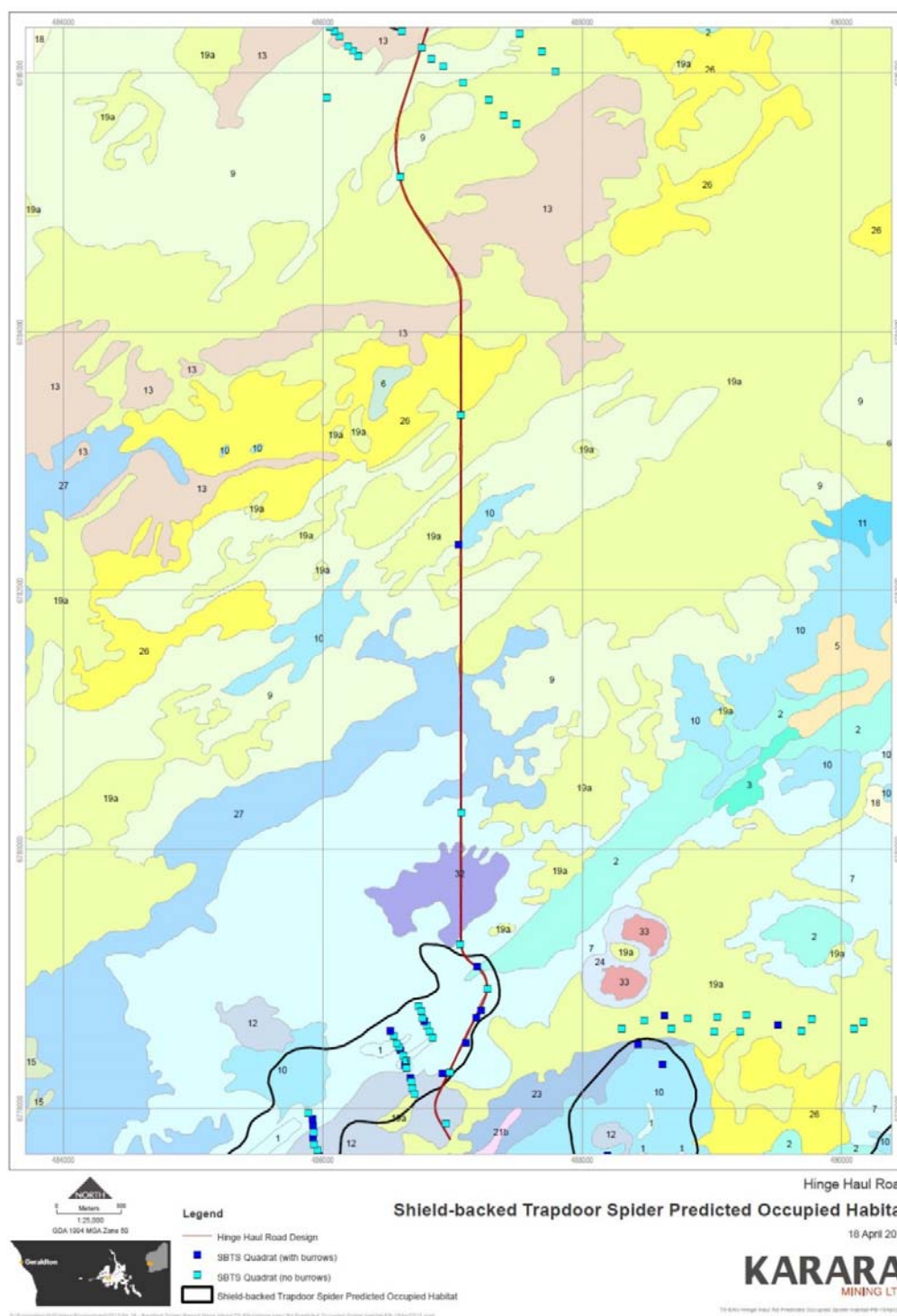


Figure 2a. Spider quadrats (squares: occupied dark blue, unoccupied light blue) and predicted spider distribution (enclosed by black lines) in the south of the haul road.

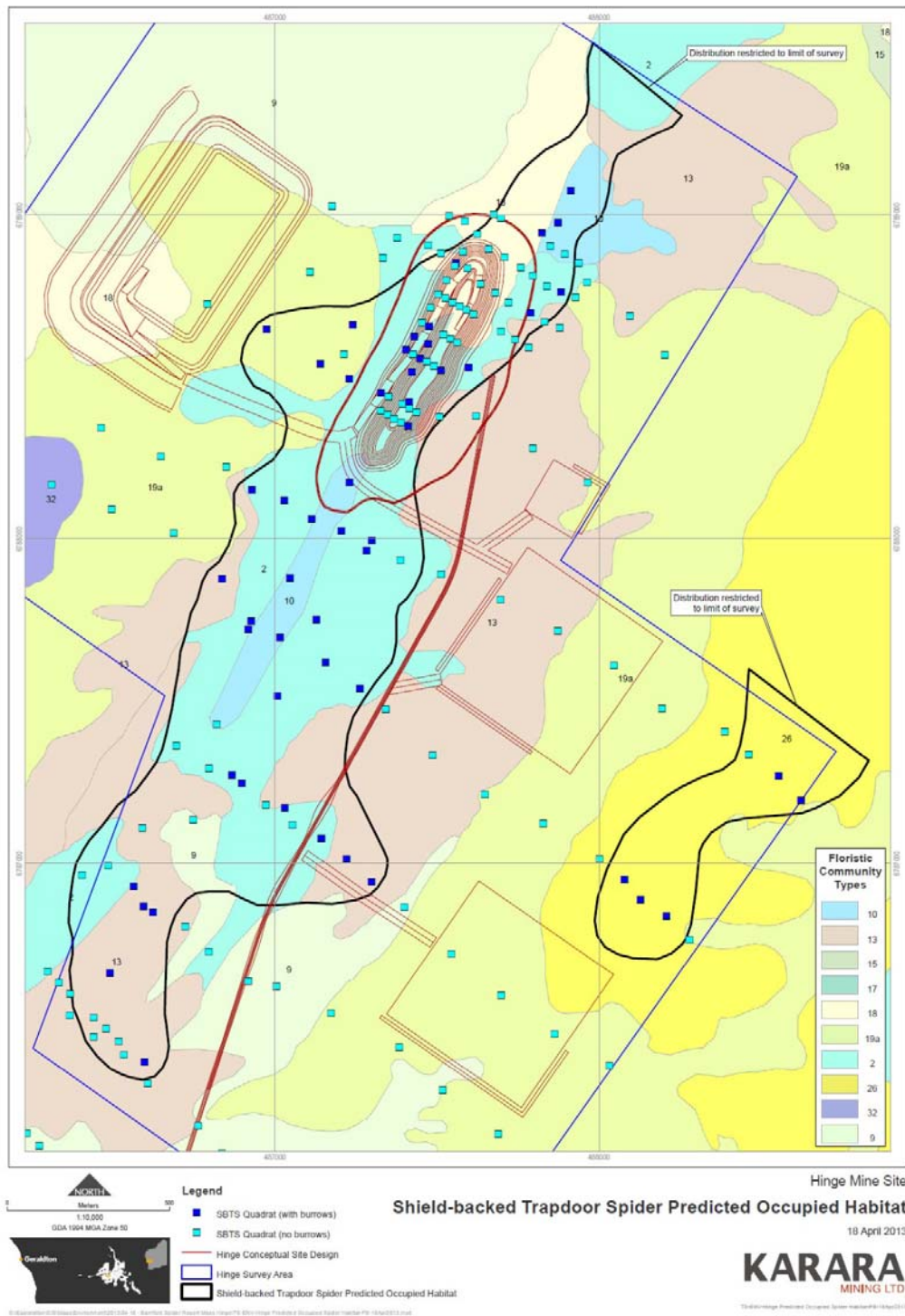


Figure 2b. Spider quadrats (squares: occupied dark blue, unoccupied light blue) and predicted spider distribution (enclosed by black lines) in Hinge and the north of the haul road



Figure 3. Habitat in most of the survey area: mixed Acacia shrubs over loam on plains.



Figure 4. Potential suitable Shield-backed Trapdoor Spider habitat; mixed Acacia shrubland on gravelly-loam soil on a slight rise.

3.2 Malleefowl

The survey area represents suitable habitat for the Malleefowl, although the central section of shrubland on plains of loam soil is of low suitability for mound construction. No active Malleefowl mounds were recorded, although very old and degraded mounds were found in the south, and mounds have also been recorded in the Hinge area to the north (Figure 5, Appendix 2). There may be an issue of roadkill if individuals are active in the area. This is of particular concern near active mounds and, while no active mounds were found during the survey, Malleefowl are known to change the mound used for breeding.

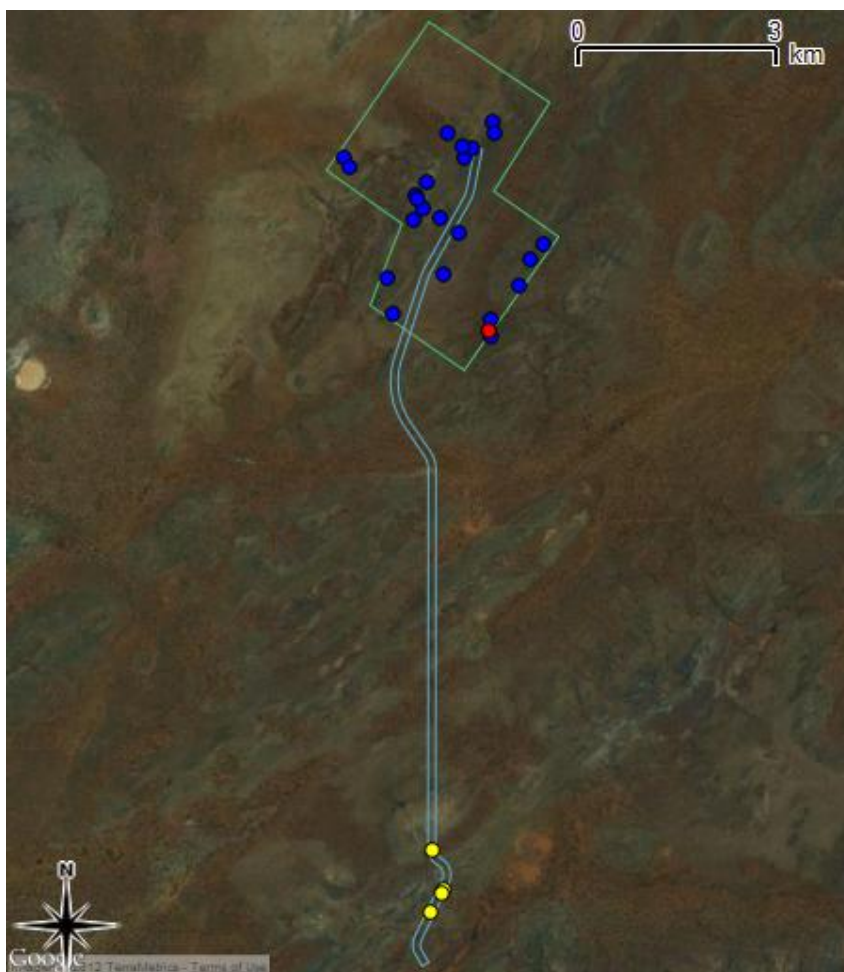


Figure 5. Location of Malleefowl mounds in the survey area (yellow circles). Inactive (blue) and active (red) mounds in the Hinge area are also shown.

3.3 Western Spiny-tailed Skink

There is little suitable habitat for the Western Spiny-tailed Skink in the survey area (Appendix 3). There are some marginal patches of Eucalypt woodland with a few logs, but most logs are too small, termite-infested or filled with mud (Figure 6). There are a few large logs but they were searched thoroughly with no evidence of the Skink found (Figure 7). Although no skinks were recorded in the survey area it does not rule out the possibility of their presence; avoiding disturbance of large Eucalyptus trees and logs will minimise impact on this species.



Figure 6. Eucalypt woodland patches within mixed Acacia; logs too small to represent suitable Skink habitat.



Figure 7. One of a few large logs present in the survey area. No evidence of the Skink was found.

3.4 Major Mitchell's Cockatoo

This species was not observed during the site inspection but has previously been seen around a waterhole a few kilometres to the east, and in the Jasper project area that lies just south-west of the Hinge project area. It can therefore be expected to occur along the Hinge haul road. However, the species requires large hollows for breeding and even in the eucalypt woodland along the central section of the project area, there were few large trees and none with obvious large hollows.

3.5 Gilled Slender Bluetongue

This lizard was not observed during the site inspection and has only been recorded twice in the overall KIOP region despite regular surveys since 2004. Those two records were from rocky ridges (Mungada and Karara) and other records (BCE database) are also from rocky sites, so the species may be restricted to at least partly rocky environments. If this

is the case, then the only possibly suitable habitat for the species along the Hinge haul road occurs on low hills in the north and south of the alignment.

3.6 SRE Invertebrates

The most suitable environments for SRE invertebrates in the general KIOP region are the rocky hills that provide mesic refugia. Such rocky hills are poorly-developed in the project area but some potentially suitable examples occur in the north and south of the alignment.

4 DISCUSSION

Two significant fauna species were confirmed as present in the project area: the Shield-backed Trapdoor Spider and Malleefowl. In addition, there may be suitable habitat for the Gilled Slender Bluetongue and for SRE invertebrates. There is little if any suitable habitat for the Western Spiny-tailed Skink and Major Mitchell's Cockatoo. Low hills with gravelly loam soils and some exposed rock in the south and north of the project area provide suitable habitat for and were found to support the Shield-backed Trapdoor Spider and Malleefowl, and may also be suitable for the Gilled Slender Bluetongue and SRE invertebrates. Minimising the clearing of rocky slopes, particularly in the southern and northern parts of the project area, will help reduce the impact on the Shield-backed Trapdoor Spider. Habitat loss from development of the haul road would be limited in extent, but the risk of roadkill to Malleefowl will need to be considered. Mounds that are active can vary from year to year, and therefore pre-clearing surveys will be needed to determine if any active mounds are nearby at the time of development. During operation of the haul road, Malleefowl will be at risk of roadkill; KML has established procedures for the minimisation of roadkill in its Malleefowl Management Plan.

Appendix 1. Spider quadrat descriptions and recorded burrows. UTM zone 50J. Spider clusters are enclosed in brackets; the numbers represent the burrow internal diameter in mm of each individual in the cluster; i indicates an inactive burrow.

Date	ID	Easting	Northing	Slope	Soil	Vegetation	Spiders	Clusters	Lichen
22/11/2012	SP1	487219	6778755	Mid Slope	Clay loam with outcropping rocks	Tall, dense <i>Acacia</i> woodland over mixed shrubs	11 (3 inactive)	(18, 10,10) (18, 15i, 10i, 8, 8, 5i, 5, 5) (20, 10, 8, 8) (15, 8, 8, 8, 6i, 6, 6, 5) (20, 6)	Yes
22/11/2012	SP2	487182	6778697	Lower Slope	Red clay loam with rocks (ironstone)	Semi dense <i>Acacia</i> <i>ramulosa</i> over sparse mixed shrubs	15 (3 inactive)	(8) (10i, 5) (8) (12i, 10i, 8, 6, 6, 6, 6, 5, 5, 5)(15)	Yes

22/11/2012	SP3	487103	6778507	Mid Slope	Red loam with rocks (ironstone)	Acacia semi open shrubs over mixed shrubs	5 (1 lid only 1 inactive)	(15, 10, 5i, 5, lid)	Yes
22/11/2012	SP4	486979	6778276	Flat	Red loam with some rocks (ironstone)	Fairly dense mixed acacia shrubland	0	-	Little
22/11/2012	SP5	486947	6777881	Flat	Orange clay loam with rocks (ironstone)	Scattered eucalypts over semi closed mixed acacia shrubs	0	-	No
22/11/2012	SPOP1	486923	6778270				2 (both inactive, not sure of ID)	(~10i, ~10i)	

22/11/2012	SP6	487269	6778922	Mid Slope	Orange loam, rocky (ironstone and quartz)	Mixed open Acacia over mixed shrubs	0	-	Yes
22/11/2012	SP7	487189	6779094	Mid Slope	Orange clay loam with rocks (ironstone)	Mixed Acacia over mixed shrubs	1	(9)	Yes
22/11/2012	SP8	487058	6779265	Lower Slope	Red loam/clay, rocky (ironstone)	Mixed Acacia shrubs over mixed shrubs	0	-	Yes
22/11/2012	SP10	487067	6780282	Flat	Red loam with a few little rocks (red rock and ironstone)	Mixed shrubs	0	-	Yes

22/11/2012	SP14	487045	6782352	Flat	Orange clay loam with rocks (small ironstone)	Mixed Acacia over mixed shrubs	2	(6, 6)	Yes
22/11/2012	SP16	487063	6783357	Flat	Orange clay loam with ironstone	Scattered eucalypts over mixed Acacia	0	-	Little
23/11/2012	SP21	486597	6785196	Flat	Orange loam, fairly rocky (ironstone and quartz)	Scattered eucalypts over mixed Acacia (including <i>A. ramulosa</i>) over mixed shrubs	0	-	Yes
1/09/2012	1A	486762	6786189	Flat	Loam with some gravel	Acacia tall, open shrubland	0	-	No

1/09/2012	2L	486917	6786635	Lower Slope	Gravelly loam	Acacia low shrubland	0	-	No
1/09/2012	3F	487142	6787077	Lower Slope	Rock gravel loam	Acacia shrubland	7 (3 adult, 4 juvenile)		Yes
1/09/2012	4H	487341	6787473	Lower Slope	Gravelly loam	Eucalypt open woodland over mixed shrubland	0	-	No
1/09/2012	5I	487512	6787890	Mid Slope	Gravelly loam	Acacia tall shrubland	0	-	No
1/09/2012	6C	487620	6788379	Mid Slope	Gravelly loam	Eucalypt and acacia tall shrubland	0	-	No

Appendix 2. Malleefowl Mounds. UTM zone 50J.

Date	ID	Easting	Northing	Width	Height	Crater	Active	Comments
22/11/2012	MF1	487203.9	6778747	6	1.5	0.3	No	Rocks and dirt no leaf litter. Shrubs growing on edge and a tree branch across the middle. 50+ years
22/11/2012	MF2	487181.7	6778697	6	0.3	0.05	No	Ancient. Tall Acacia shrubs growing in it. Rocks and lichen, no litter.
22/11/2012	MF3	487040.7	6778453	6	0.3	0.05	No	Ancient. Tall Acacia shrubs growing in it. Rocks, no litter.
22/11/2012	MF4	487057.9	6779265	7	0.5	0.5	No	Very old. Rock and dirt no litter. Trees growing around edge. Recent digging, probably goanna. 100+ years

Appendix 3. Habitat Notes. UTM zone 50J.

Date	Easting	Northing	Malleefowl	Spiders	Skinks
22/11/2012	487219	6778755	Probable	Occupied	Unsuitable
22/11/2012	487182	6778697	Probable	Occupied	Unsuitable
22/11/2012	487103	6778507	Probable	Occupied	Unsuitable
22/11/2012	486979	6778276	Probable	Probable	Unsuitable
22/11/2012	486947	6777881	Probable	Unsuitable	Unsuitable
22/11/2012	487269	6778922	Probable	Probable	Unsuitable
22/11/2012	487189	6779094	Probable	Occupied	Unsuitable
22/11/2012	487058	6779265	Probable	Unsuitable	Unsuitable
22/11/2012	487074	6779776	Unsuitable	Unsuitable	Unsuitable
22/11/2012	487067	6780282	Probable	Unsuitable	Unsuitable
22/11/2012	487086	6780775	Probable	Unsuitable	Unsuitable
22/11/2012	487077	6781302	Probable	Unsuitable	Probable
22/11/2012	487079	6781845	Probable	Unsuitable	Unsuitable
22/11/2012	487045	6782352	Probable	Occupied	Unsuitable
22/11/2012	487069	6782891	Probable	Unsuitable	Unsuitable
22/11/2012	487063	6783357	Probable	Unsuitable	Unsuitable
23/11/2012	487065	6783573	Probable	Unsuitable	Unsuitable

23/11/2012	487065	6783822	Probable	Unsuitable	Unsuitable
23/11/2012	487084	6784364	Probable	Unsuitable	Unsuitable
23/11/2012	486832	6784766	Probable	Unsuitable	Probable
23/11/2012	486597	6785196	Probable	Unsuitable	Probable
23/11/2012	486614	6785694	Probable	Unsuitable	Unsuitable
23/11/2012	486729	6786117	Probable	Unsuitable	Unsuitable
Sep-12	486762	6786189	Probable	Unsuitable	Unsuitable
Sep-12	486917	6786635	Probable	Unsuitable	Unsuitable
Sep-12	487142	6787077	Probable	Occupied	Unsuitable
Sep-12	487341	6787473	Probable	Unsuitable	Unsuitable
Sep-12	487512	6787890	Probable	Unsuitable	Unsuitable
Sep-12	487620	6788379	Probable	Unsuitable	Unsuitable
22/11/2012	486923	6778270		Unsuitable	
22/11/2012	487119	6779972	Probable		
22/11/2012	487048	6779495	Probable		
22/11/2012	487067	6781398	Probable		
22/11/2012	487041	6780020	Probable		
22/11/2012	487068	6781686	Probable		
22/11/2012	487061	6781493	Probable		Probable

22/11/2012	486981	6778202			Probable
22/11/2012	487107	6780441			Probable
22/11/2012	487116	6780486			Probable
22/11/2012	487106	6780551			Probable
22/11/2012	487114	6780814			Probable
22/11/2012	487092	6781081			Probable
22/11/2012	487095	6781145			Probable
22/11/2012	487117	6781438			Probable
22/11/2012	487098	6781578			Probable
22/11/2012	487086	6783180			Probable
23/11/2012	486930	6784644			Probable
23/11/2012	486832	6784766			Probable
23/11/2012	486747	6784915			Probable
22/11/2012	487068	6781086			Probable
22/11/2012	487089	6781160			Probable
22/11/2012	487053	6780572			Probable
22/11/2012	487038	6780421			Probable



Figure i. Spider quadrats (red, pink) and spider habitat description points with unsuitable habitat which were not searched (orange), occupied quadrats shown in pink.



Figure ii. Probable (red) and unsuitable (blue) Malleefowl habitat description points.



Figure iii. Probable (red) and unsuitable (blue) Spiny-tailed Skink habitat description points.