

Conservation Significant Vertebrate Fauna Monitoring for Ravensthorpe Nickel Operations - 2015



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Prepare for:

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Front Cover: Chuditch (Dasyurus geoffroii) captured on a motion sensitive camera trap



EXECUTIVE SUMMARY

In accordance with Ministerial condition 7-1 of Statement 633, Ravensthorpe Nickel Operations (RNO) requested a vertebrate fauna monitoring survey be undertaken using the permanent trapping and motion sensitive camera sites established in 2013. Threatened terrestrial vertebrate fauna targeted in this monitoring survey included the Heath Rat (*Pseudomys shortridgei*), Western Mouse (*Pseudomys occidentalis*), Western Whipbird (*Psophodes nigrogularis oberon*), Chuditch (*Dasyurus geoffroii*) and Southern Brown Bandicoot (*Isoodon obesulus fusciventer*).

Five hundred aluminium box traps and 100 wire cage traps were set at multiple locations in a variety of habitat types and in areas with two fire histories. Fifty motion sensitive camera traps were deployed in some of the trapping sites and in the two areas where Coffey Environments (2010) recorded Chuditch. Ten Western Whipbird monitoring sites that were used in 2013 were revisited and surveyed.

No Heath Rats, Western Mice or Southern Brown Bandicoots were recorded. Australian Ravens, emus, cats, Western Brush Wallabies, echidnas, bobtails and Rosenberg's goanna were recorded at all camera monitoring sites. Western Grey Kangaroos, Brush Bronzewings and the fox were present in five of the six camera monitoring sites. Chuditch were recorded at monitoring sites D and F, on the hill and in the gully. Mice/rats were recorded at less frequently than in 2014. Malleefowl were not recorded during this survey. Western Whipbirds were recorded at eight of the 10 monitoring sites and as an incidental observation. This survey confirmed the presence of an established population of Western Brush Wallabies and Chuditch in the project area, and an abundance of cats and foxes across the site.

The declining number of small mammals, and in particular no records of the Heath Rat, Western Mouse and malleefowl is likely to be due, in part, to predation by the abundant cats and foxes in the project area. It is therefore recommended that an effective cat and fox reduction program is developed and implemented for the project area.



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1 INTRODUCTION

1.1 Background

In accordance with Ministerial condition 7-1 of Statement 633; Ravensthorpe Nickel Operations (RNO) requested a vertebrate fauna monitoring survey be undertaken using the permanent trapping sites established in 2013 and adjusted in 2014 to accommodate an expansion in mining activity, and a camera trap survey at sites established in 2014. The location of the project area is shown in Figure 1.

The approved fauna management plan requires:

- the establishment of permanent monitoring sites on and around rehabilitated areas, and for these sites to be included in the annual monitoring;
- maintain the fauna monitoring sites of the RNO and adjacent areas of the Bandalup Corridor;
- comparable trapping intensity to be applied in the monitoring program; and
- monitoring the population of rare fauna.

The rehabilitation program has commenced and is progressing but it is too early to undertake monitoring of the vertebrate fauna in these areas. Threatened terrestrial vertebrate fauna that require monitoring include the Heath Rat (*Pseudomys shortridgei*), Western Mouse (*Pseudomys occidentalis*), Western Whipbird (*Psophodes nigrogularis oberon*), Chuditch (*Dasyurus geoffroii*) and Southern Brown Bandicoot (*Isoodon obesulus fusciventer*).

Malleefowl (*Leipoa ocellata*) mounds were present in the RNO tenements prior to the establishment of the mine, but these mounds were in the mining area and have been removed. Prior to this survey, Malleefowl had been recorded once (Coffey Environments 2010) in the project area since 2000 and on three occasions during the 2014 monitoring survey (Terrestrial Ecosystems 2014).

1.2 Previous monitoring surveys and reports

There have been numerous previous fauna surveys undertaken for a variety of purposes on the RNO tenements. These include:

- Cancilla, D. and Johnson, B. (2013) The status and ecology of the *Pseudomys shortridgei* (Heath Mouse) in southern western Australia. Unpublished report for Murdoch University.
- Chapman A. (2000) Fauna Management Plan Year One 1999-2000. Unpublished report for Comet Resources, Ravensthorpe.
- Craig G.F. and Chapman A. (1998) Ravensthorpe Nickel Project. Comet Resources NL. Vegetation, Flora and Fauna Survey. Unpublished report for Ravensthorpe Nickel Project.
- Biota Environmental Sciences (2000) Ravensthorpe Nickel Project Fauna Survey 2000. Unpublished report for Ravensthorpe Nickel Operations.
- Biota Environmental Sciences (2005) BHP Billiton Ravensthorpe Nickel Operations Fauna Trapping Program 2005. Unpublished report for BHP Billiton, Perth.
- Coffey Environments (2009) Terrestrial Vertebrate Fauna Risk Assessment for the Shoemaker-Levy Ore Body, Ravensthorpe Nickel Operations, Unpublished report for BHP Billiton Ravensthorpe Nickel, Ravensthorpe.
- Coffey Environments (2010) Fauna Monitoring, Ravensthorpe Nickel Operations, January 2010. Unpublished report for Ravensthorpe Nickel Operations, Ravensthorpe.
- Terrestrial Ecosystems (2013) Conservation Significant Vertebrate Fauna Monitoring for Ravensthorpe Nickel Operations, Ravensthorpe. Unpublished report for FQM Australia Nickel.
- Terrestrial Ecosystems (2014) Conservation Significant Vertebrate Fauna Monitoring for Ravensthorpe Nickel Operations 2014. Unpublished report for FQM Australia Nickel.

The Craig and Chapman (1998) report for the fauna survey of the project area is unavailable, so it has not been possible to extract the relevant data on conservation significant fauna from this report.

A brief report by Cancilla and Johnson (2013) indicated that 720 trap-nights was used in an attempt to catch the Heath Rat at Bandalup Hill; no Heath Rats were caught. No other details of trapping sites were provided.



Chapman (2000) reported on surveys undertaken between 8-23 November 1999 and 4-17 April 2000 as the first year of a long term monitoring program for three threatened mammals and two threatened bird species that were known to be present in the project area. This survey followed on from the earlier survey work undertaken by Craig and Chapman (1998). Nine sites were established. Sites E1-E5 had 20 aluminium box traps and sites CMS1-CMS4 had one cage trap, 20 aluminium box traps and 12 pit traps. In addition, 12 cage traps were deployed in other locations. The total trapping effort was 480 pit trap-nights, 1,000 aluminium box trap nights and 200 cage trap nights. The trap type that captured the conservation significant fauna was not mentioned in the report. Conservation significant fauna recorded during these two surveys are as shown in Table 1.

Species	Common Name	N ^o	Easting	Northing	Site
-			(AMG)	(AMG)	
Psophodes nigrogularis	Western Whipbird	8	254881	6272874	E1
Psophodes nigrogularis	Western Whipbird	3	254916	6273037	E2
Psophodes nigrogularis	Western Whipbird	1	256141	6273526	E3
Psophodes nigrogularis	Western Whipbird	2	256922	6272980	E4
Psophodes nigrogularis	Western Whipbird	5	256813	6274885	E5
Psophodes nigrogularis	Western Whipbird	4	258863	6271850	CMS1
Psophodes nigrogularis	Western Whipbird	6	256612	6272327	CMS2
Psophodes nigrogularis	Western Whipbird	13	254881	6272874	CMS3
Psophodes nigrogularis	Western Whipbird	1	254662	6274642	CMS4
Psophodes nigrogularis	Western Whipbird	1	256065	6272214	
Leipoa ocellata	Malleefowl	1	255832	6273571	
Leipoa ocellata	Malleefowl	1	255769	6272758	
Leipoa ocellata	Malleefowl	1	253853	6273499	
Leipoa ocellata	Malleefowl	1	254881	6272874	
Pseudomys occidentalis	Western Mouse	5	258863	6271850	CMS1
Pseudomys occidentalis	Western Mouse	4	256612	6272327	CMS2
Pseudomys occidentalis	Western Mouse	7	254916	6273037	E2
Pseudomys occidentalis	Western Mouse	1	256922	6272980	E4
Pseudomys shortridgei	Heath Rat	4	256141	6273526	E3
Pseudomys shortridgei	Heath Rat	1	256813	6274885	E5
Pseudomys shortridgei	Heath Rat	1	254881	6272874	E1
Isoodon obesulus	Southern Brown Bandicoot	1	254881	6272874	E1

Table 1. Conservation significant fauna recorded by Chapman (2000)

Biota Environmental Sciences (2000) undertook a survey for Sinclair Knight Merz as part of the preparation of an environmental impact assessment (EIA). Trapping was undertaken between 13-18 October 2000, with 20 aluminium box traps, 12 pit traps and two cage traps deployed at six sites (RNO01-06) mostly for five nights, and a seventh site (RNO07) had 12 pit-traps deployed for five nights. The total trapping effort was 600 aluminium box trap-nights, 534 pit-trap nights and 60 cage trap-nights. Conservation significant fauna recorded during this survey are shown in Table 2.



Species	Common Name	Nº	Easting	Northing	Site
-			(AMG)	(AMG)	
Leipoa ocellata	Malleefowl	1	258752	6272315	Site 5
Leipoa ocellata	Malleefowl	1	251832	6278164	
Psophodes nigrogularis	Western Whipbird		251997	6280520	Site 4
Psophodes nigrogularis	Western Whipbird		258494	6272294	Site 5
Psophodes nigrogularis	Western Whipbird		258808	6270857	Site 6
Psophodes nigrogularis	Western Whipbird		258805	6271802	Site 7
Psophodes nigrogularis	Western Whipbird		254881	6272874	E1
Psophodes nigrogularis	Western Whipbird		254916	6273037	E2
Psophodes nigrogularis	Western Whipbird		256922	6272980	E4
Psophodes nigrogularis	Western Whipbird		256813	6274885	E5
Psophodes nigrogularis	Western Whipbird		250688	6278164	
Psophodes nigrogularis	Western Whipbird		258822	6272248	
Pseudomys occidentalis	Western Mouse	1	254986	6273022	
Pseudomys occidentalis	Western Mouse	1	255037	6273031	
Pseudomys shortridgei	Heath Rat	1	251997	6280520	Site 4

Table 2. Conservation significant fauna recorded by Biota Environmental Sciences (2000)

Biota Environmental Sciences (2005) undertook a survey between 23-26 August 2005 for RNO with a focus on recording short-range endemic invertebrates in the project area. Six sites (RNOE1-E5, Elliott line) had 20 aluminium box traps set for three nights, one site had 50 cage traps set for two nights and there were eight sites with 12 pit-fall traps, eight aluminium box traps and two cage traps. The total trapping effort was 672 aluminium box trap-nights, 408 pit trap-nights and 168 cage trap-nights. There is no record of the trap type that caught the conservation significant fauna. Conservation significant fauna recorded during this survey are shown in Table 3.

Table 3. Conservation significant fauna recorded by Biota	Environmental Sciences (200	5)
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Species	Common Name	N°	Easting	Northing	Site
			(AMG)	(AMG)	
Psophodes nigrogularis	Western Whipbird		256780	6272585	RNOCMS2
Psophodes nigrogularis	Western Whipbird		256922	6272980	RNOE4
Psophodes nigrogularis	Western Whipbird		257142	6273254	
Pseudomys occidentalis	Western Mouse	4	256922	6272980	RNOE4

Biota Environmental Sciences (2005) reported undertaking a fauna survey in December 2001 that has not been reported. Lines of 20 aluminium box traps were set at RNOE1, RNOE2, RNOE3, RNOE4 and RNOE5, and these were the same sites used by Chapman (2000). In addition, pit traps, cage traps and aluminium box traps were deployed at RNOCTS01, RNOCTS02, RNOCTS03, RNOCTS04, RNOCMS01, RNOCMS02, RNOCMS03, RNOCMS04 and cage traps were deployed at a cage trapping line.

Coffey Environments (2009) undertook a vertebrate fauna survey of the Halley's pit surrounds and Shoemaker– Levy area. In part, this survey was to meet the Ministerial conditions for on-going fauna monitoring of conservation significant fauna and to provide analogue sites for when fauna monitoring was undertaken in the rehabilitated areas. Pit-traps, aluminium box traps and cage traps were deployed. Conservation significant fauna recorded during this survey are as shown in Table 4. This report also indicated that a Chuditch had been killed on the access road into the mine, but no coordinates were available.



Species	Common Name	Nº	Easting	Northing	Sites
			(WGS84)	(WGS84)	
Isoodon obesulus	Southern Brown Bandicoot	1	249835	6281541	CK5
Psophodes nigrogularis	Western Whipbird		257482	6276271	CK3
Psophodes nigrogularis	Western Whipbird		251701	6281945	ML1
Psophodes nigrogularis	Western Whipbird		257631	6276419	ML2

Table 4. Conservation significant fauna recorded by Coffey Environments (2009)

Coffey Environments (2010) undertook a second vertebrate fauna monitoring survey to comply with Ministerial conditions. Survey sites included those used in 2009 plus 14 additional sites (N1-N10 and C1-C4). These additional sites were used to provide a comparison with the existing 20 Shoemaker-Levy and Halley's pit sites. Pit-traps, aluminium box traps and cage traps were deployed at N1-N10, and cage traps where deployed at C1-C4. Chuditch were caught in cage traps, and the Western Mouse and Heath Rat were caught in pipe pit-traps. Conservation significant fauna recorded during this survey are as shown in Table 5.

Table 5. Co	onservation	significant	fauna 1	recorded	by (Coffey	Environments	(2010)
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Species	Common Name	Nº	Easting	Northing	Sites
			(WGS84)	(WGS84)	
Dasyurus geoffroii	Chuditch	9	256130	6272352	Cage 1
Dasyurus geoffroii	Chuditch	1	256872	6271544	Cage 2
Pseudomys occidentalis	Western Mouse	1	256777	6272598	N1
Pseudomys occidentalis	Western Mouse	1	258940	6272024	N8
Pseudomys shortridgei	Heath Rat	1	257631	6276419	ML2
Leipoa ocellata	Malleefowl	1	257482	6276271	

The Terrestrial Ecosystems (2013) survey established six trapping sites. These were adjusted in 2014 to accommodate an expansion in the mine's activity. Sites A, C, D and E had 100 aluminium box traps and 20 wire cage traps, and sites G and F had 50 aluminium box traps and 10 wire cage traps. The location of all trapping sites was marked with a star picket. In addition, eleven sites that were also marked with a star picket were established to monitor the presence of Western Whipbirds. In 2014, 50 motion sensitive camera sites were established to monitor the presence of Malleefowl, Chuditch, Western Brush Wallabies, cats and foxes.

1.3 Project objectives and scope of works

Using the established trapping sites, a third survey for Heath Rat, Western Mouse, Southern Brown Bandicoot, Chuditch and Western Whipbirds was undertaken. Motion sensitive camera traps were deployed at sites established in 2014 to survey for Malleefowl, Chuditch, Western Brush Wallabies, cats and foxes.



2 METHODS

Terrestrial Ecosystems (2013) outlined the rationale for the trapping program and Whipbird observations. This report recommended the use of motion and infrared sensitive camera traps to record the presence of Malleefowl, Chuditch, Western Brush Wallaby, cats and foxes in the project area. This recommendation was implemented in 2014 and 2015.

2.1 Survey sites

Five hundred aluminium box traps ($10 \times 10 \times 33$ cm) and 100 wire cage traps ($20 \times 20 \times 56$ cm) were set at multiple locations in a variety of habitat types and in areas with two fire histories (Plate 1; Appendix A). Figures 2a-h indicate the location of all trapping sites. Fifty motion sensitive camera traps were deployed in some of the trapping sites and in the two areas where Coffey Environments (2010) recorded Chuditch (Appendix A).



Plate 1. Star picket indicating an aluminium box and a wire cage trap site

Aluminium box traps were baited with a mixture of peanut butter, sardines and rolled oats. Wire cage traps had two baits; a bolus of peanut butter, sardines and rolled oats and a chicken neck. Baits were replenished if taken and on day three of the survey.



2.2 Cameras

Fifty motion and infrared sensitive cameras were deployed as follows:

- Trapping site A 6 cameras
- Trapping site D 9 cameras
- Trapping site E 10 cameras
- Trapping site F 5 cameras
- Coffey Environments' (2010) Chuditch trapping site on the 'hill' 10 cameras
- Coffey Environments' (2010) Chuditch trapping site in the 'gully' 10 cameras

Bait pods (Plate 2) that contained a bolus of peanut butter, sardines and rolled oats were topped up with mullie oil before they were partly buried into the ground and secured with a metal stake. Cameras were mounted on a star picket (Plate 3) 2-4m from the bait pod and directed to capture images of fauna moving through the area or attracted to the bait.



Plate 2. Bait pod secured in the ground

Plate 3. Camera attached to a star picket

2.3 Whipbird observations

Ten Western Whipbird monitoring sites that were used in 2014 were revisited. Surveys for Western Whipbirds were conducted within a two hour period following sunrise using the following protocol:

- initially listening for a period of 10 minutes;
- if no whipbirds were heard, then the call was played; and
- a further 10 minute listening period was undertaken after the call was played back.

As soon as a Western Whipbird was heard the survey was ended. The call playback was not played if a Western Whipbird was heard in the initial 10 minutes of listening.

Incidental observations of Western Whipbirds calling were also recorded while conducting other work.

2.4 Avian survey

Birds seen or heard were recorded while undertaking other tasks and observations were used to create an avian species list for the project area.

2.5 Survey personnel

Three Terrestrial Ecosystems staff were involved in the field survey (Table 6). They were assisted by Nathan Ingate, Darius Hakayobe and Luc Cotter for the trapping survey and deployment of cameras. The support of onsite environmental staff was much appreciated.



Cameras were deployed between 14-17 September 2015 and closed on 14-15 October 2015. Traps were laid out and opened on 13-14 October 2015. All traps were cleared daily and closed on 18-19 October 2015 for five nights of trapping. The report was prepared by Dr Graham Thompson and reviewed by Dr Scott Thompson.

Table 6. Qualifications an	l experience of Terrestrial	Ecosystems survey team
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Name	Qualifications	Experienced
Dr Graham Thompson	PhD (Zoology)	> 20 years
Dr Scott Thompson	BSc, MSc, PhD (Env Sci/Man)	> 15 years
Ray Turnbull	B Nat Sc, G.Dip Ornithology	> 7 years
Dr Margot Oorebeek	PhD (Zoology)	> 7 years
Edward Swinhoe	BA	> 5 years

2.6 Weather

Table 7 shows the daily minimum and maximum temperatures and rainfall for the survey period as recorded by the RNO weather station.

Date	Min. Temp.	Max. Temp	Rainfall (mm)
13/10/2015	16.71	36.02	0.0
14/10/2015	12.22	26.10	0.4
15/10/2015	6.31	19.40	0.2
16/10/2015	4.01	25.37	0.0
17/10/2015	7.28	33.00	0.0
18/10/2015	12.91	29.78	0.4
19/10/2015	13.29	13.29	0.4

Table 7. Daily weather data record in the RNO project area

2.7 Limitations

2.7.1 Weather

The weather was suitable for trapping and was generally warmer than in previous surveys.



3 RESULTS

3.1 Aluminium box and cage trap captures

Trapping sites used in 2014 remained unchanged.

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Appendix 2 contains the complete list of vertebrate fauna caught and the exact location for each capture. Table 8 provides a summary of the number of individuals caught in the trapping program for each species across all sites.

Taxa	Species	Common Name	Number caught
Bird	Corvus coronoides	Australian Raven	3
	Strepera versicolor	Grey Currawong	1
Mammal	Felis catus	Cat	2
	Rattus fuscipes	Bush rat	1
Reptile	Tiliqua occipitalis	Western Bluetongue	7
	Tiliqua rugosa	Bobtail	111
	Varanus rosenbergi	Heath Monitor	30

Table 8. Number of individuals caught for each species

The high number of Bobtails and Rosenberg's goanna caught in traps correlates with the higher ambient temperatures during the trapping program. Both species of reptile are abundant in the project area in the dense heath undergrowth.

3.2 Camera traps

Vertebrate fauna have been recorded for each camera and the data grouped by sites on a 'presence only' basis (Tables 10 and 11). Australian Ravens, emus, cats, Western Brush Wallabies, echidnas, bobtails and Rosenberg's goanna were recorded at all sites (Table 9). Western Grey Kangaroos, Brush Bronzewings and the fox were present in five of the six sites. Of interest, Chuditch were recorded at sites D and F, on the hill and in the gully, and had not been recorded by the cameras in the previous year's survey. Unidentified rodents were recorded at less sites and less frequently than in 2014.

Fable 9.	. Species	recorded	in	motion	sensitive	camera	traps
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	Trapping sites	Site A		Site D		Site E		Site F		Hill		Gu	ılly
Species	Year	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Leipoa ocellata	Malleefowl	Х										Х	
Dasycercus geoffroii	Chuditch				Х				Х		Х		Х
Felis catus	Feral Cat	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Macropus fuliginosus	Western Grey Kangaroo	Х	Х	Х	Х	Х	Х	Х	Х	Х		Х	Х
Macropus irma	Western Brush Wallaby	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Mus/Rattus	Mouse/Rat sp.	Х		Х		Х			Х	Х	Х	Х	Х
Oryctolagus cuniculus	Rabbit				Х			Х	Х	Х			
Tachyglossus aculeatus	Echidna	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Vulpes vulpes	Red Fox	Х	Х	Х	Х	Х	Х	Х	Х			Х	Х



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				Sit	e A			Site D						Site E							Site F										
	Trapping sites	A1	A3	A5	A57	A60	A60	DI	D20	D30	D40	D50	D60	D70	D80	D90	E1	E10	E100	E20	E30	E51	E60	E70	E80	E90	F21	F25	F26	F40	F48
Species	Camera No	24	11	47	37	6	43	41	10	13	25	35	33	17	40	2	49	23	44	29	15	50	32	26	36	9	39	5	12	3	7
Accipiter sp.	Hawk																														
Anthochaera carunculata	Red Wattlebird																										1				
Colluricincla harmonica	Grey Shrikethrush											1		1	1																
Corvus coronoides	Australian Raven	1+	2+	1+	2	2+	2+	2+	2+	2	1+	2+	1+	2+	2+	1+	2+	1+	2+	2+	2+	2+	2+	1+	2+	2+	1+	1+	1	1+	1+
Cracticus torquatus	Grey Butcherbird																						1								
Dromainus novaehollandiae	Emu	12+	9+	9+	12+	19+	16+	14 +	6+	7+	3+	3+	2	3+	3	4+	7+	5+	18 +	10 +	5+	17 +	21 +	13+	13 +	18 +	29+	26+	28 +	29+	29+
Drymodes brunneopygia	Southern Scrub-Robin							1	1+	1+						1															
Gliciphila melanops	Tawny-crowned Honeyeater				2		1	1																1+						1	
Hylacola cauta	Shy Heathwren																1			1											
Lichenostomus cratitius	Purple-gaped Honeyeater					1																									
Oreoica gutturalis	Crested Bellbird					1	2																								
Pardalotus punctatus	Spotted Pardalote					1																									
Phaps chalcoptera	Common Bronzewing	2																					2			2					
Phaps elegans	Brush Bronzewing		1		1+	1+			1	1+		2+		1+	2	2			1+			1				1	2+	2+	2+		
Phylidonyris niger	White-cheeked Honeyeater		1																				1+								
Phylidonyris novaehollandiae	New Holland Honeyeater																														
Pomatostomus superciliosus	White-browed Babbler	1						2	1						1	1															
Psophodes nigrogularis	Western Whipbird							1	1																				1		
Rhipidura leucophrys	Willie Wagtail													1																1	1
Sericornis frontalis	White-browed Scrubwren																														
Stagonopleura oculata	Red-eared Firetail																														
Strepera versicolor	Grey Currawong		1										1														1+	1	1		1+
Turnix varia	Painted Button-quail		2					1																				1			
Dasycercus geoffroii	Chuditch								1		1			1	1+	1+											1	1			
Felis catus	Feral Cat	1+	1+	2+	1+	1+	1+	2						1+	1+	1+	1	1			1			2+	1+	1	4	3	2	2	1
Macropus fuliginosus	Western Grey Kangaroo	1	1+	1+	1+	1+		2+		1+	1			3+	1+	1+	2	2+	4+	4+	1+	2+	4+	2+	3+	3+	5+	6+	6+	5+	5+
Macropus irma	Western Brush Wallaby		3+	3+	2			1		1				3+	1+	3+	2	3+	2+	1+	1	1	3+	1+	2+	1	1		1+		2
Mus/Rattus	Mouse/Rat sp.																														1
Oryctolagus cuniculus	Rabbit															1											2+	2+			
Tachyglossus aculeatus	Echidna	1+ 1		1+	1	1													1			1		1							
Vulpes vulpes	Red Fox	xx 1				2+	2	2	1	1																					
Tiliqua occipitalis	Western Bluetongue 1 2			2																											
Tiliqua rugosa	Bobtail 1 1 1 1 2 1+ 1 1 1 1					2+	1+																								
Varanus rosenbergi	Heath Monitor		1			1	2+										1+												1		

Table 10. Fauna present as recorded on cameras at four trapping sites



	Site		Hill where Chuditch was caught								Gully were Chuditch was caught										
	Camera No	27	31	1	48	46	45	4	20	16	19	18	22	42	14	21	30	8	38	34	28
Species	Common name																				
Accipiter sp.	Hawk												1								
Anthochaera carunculata	Red Wattlebird															1					
Colluricincla harmonica	Grey Shrikethrush																	1			
Corvus coronoides	Australian Raven	1+	2+	2+	2+	1+	1+	1+	1+	1+	1+	1+	1+	2+	2+	1+	1+	1+	1 +	1+	2+
Cracticus torquatus	Grey Butcherbird										1										
Dromainus novaehollandiae	Emu											7	11 +	18	5+		3	1	10	8	8+
Drymodes brunneopygia	Southern Scrub-Robin								1												
Gliciphila melanops	Tawny-crowned Honeyeater																				
Hylacola cauta	Shy Heathwren											1									
Lichenostomus cratitius	Purple-gaped Honeyeater																				
Oreoica gutturalis	Crested Bellbird																				
Pardalotus punctatus	Spotted Pardalote																				
Phaps chalcoptera	Common Bronzewing													1							
Phaps elegans	Brush Bronzewing	1+	1 +				2+			1+	1+										
Phylidonyris niger	White-cheeked Honeyeater																				
Phylidonyris novaehollandiae	New Holland Honeyeater						1														
Pomatostomus superciliosus	White-browed Babbler										1										
Psophodes nigrogularis	Western Whipbird																				
Rhipidura leucophrys	Willie Wagtail																				
Sericornis frontalis	White-browed Scrubwren	1 +																			
Stagonopleura oculata	Red-eared Firetail	1+																			
Strepera versicolor	Grey Currawong												1+	2+	1+	1+	1+	2+	1 +	2+	2+
Turnix varia	Painted Button-quail																				
Dasycercus geoffroii	Chuditch	1			1	1	1+		1	1	1								1		
Felis catus	Feral Cat							1				1	2+	1+	1+				1		1
Macropus fuliginosus	Western Grey Kangaroo											3+	7+	3+	4+	3+	4+	5+	5+	5+	4+
Macropus irma	Western Brush Wallaby	2	1								3		1		2	2+	2	3+	1 +	1	2+
Mus/Rattus	Mouse/Rat sp.	4+	4+ 1+ 2+ 2+ 4+ 1+ 3+ 2+						1+												
Oryctolagus cuniculus	Rabbit																				
Tachyglossus aculeatus	Echidna		1	1+	1	1+	1+	1 +	1+	1+	1+						1+	1+		1	
Vulpes vulpes	Red Fox												1		1+		1+	1			1
Tiliqua occipitalis	Western Bluetongue						1														
Tiliqua rugosa	Bobtail	1+	1	1+		1				2+	1				1+	1+	2+	1+	1+	1+	2+
Varanus rosenbergi	Heath Monitor	1+	+ 1 2+ 2+													1					

Table 11. Fauna present as recorded on cameras at the two sites where Chuditch were caught





Plate 10. Rosenberg's goanna

Plate 11. Emu and chicks

3.3 Western Whipbirds

Surveys for Western Whipbirds were conducted between 15 and 18 September 2015 using the protocol described in the methods section. Results are shown in the Table 12. A detail of an incidental observation is also provided. Western Whipbirds were recorded at eight of the 10 monitoring sites and as an incidental observation.



Table 12. Western Whipbird observations

Site	Findings
WW-1	Surveyed on 16-09-2015 (0706-0712). During the initial listening period a whipbird was
	heard calling at 0712 approximately 100m to the north.
WW-2	Surveyed on 16-09-2015 (0639-0653). Two whipbirds were heard calling four minutes after
	the call was played. One individual remained 100m to the south-east, while the other
	individual was observed calling from a low Eucalypt 20m east of the observer.
WW-3	Surveyed on 17-09-2015 (0630-0650) and (1523-1543). No whipbirds recorded. Surveyed
	again on 18-09-2015 (0620-0624). Bird heard calling 250m to the west.
WW-4	Surveyed on 17-09-2015 (0725-0743). A possible whipbird was heard calling approximately
	150m to the north-east. The call was very faint due to the wind. Resurveyed on 18-09-2015
	(0631-0646). Bird heard calling strongly 250m to the north-west.
WW-5	Surveyed on 16-09-2015 (0622-0630). A whipbird was heard calling at 0630 about 200m to
	the north during the initial listening period.
WW-6	Surveyed on 16-09-2015 (0551-0611). No whipbirds recorded. Surveyed again on 17-09-2015
	(0550-0610) and (1443-1503). No whipbirds recorded.
WW-8	Surveyed on 15-09-2015 (0544-0600). A whipbird was heard at a distance of approximately
	250m to north north-west six minutes after the call was played.
WW-9	Surveyed on 15-09-2015 (0611-0612). A whipbird was heard calling approximately 100m to
	the south one minute after arrival at the site.
WW-10	Surveyed on 15-09-2015 (0630-0650). No whipbirds recorded. Resurveyed on 16-09-2015
	(1540-1640) and 17-09-2015 (0830-0930) with calls played every ten minutes. No whipbirds
	recorded.
WW-11	Surveyed on 17-09-2015. (0654-0714). No whipbirds recorded. Surveyed again in the
	afternoon (1546-1606) and a whipbird was heard calling 30m to the south two minutes after
	the survey had finished (1608).

Incidental Whipbird records

15-09-2015 - A whipbird was heard calling at 1053 at post D20 and again at 1113 at post D50 while installing cameras on Trap line D. This is in the proximity of site WW1.

3.4 Malleefowl

Malleefowl were not recorded during the survey.

3.5 Western Brush Wallaby

Images were obtained of Western Brush Wallabies (Macropus irma) at all sites (Table 10-11).

3.6 Avian survey results

Fifty one species of birds were recorded during the fauna monitoring program (Table 13).



Family	Species	Common Name
Casuariidae	Dromaius novaehollandiae	Emu
Columbidae	Phaps chalcoptera	Common Bronzewing
	Phaps elegans	Brush Bronzewing
	Ocyphaps lophotes	Crested Pigeon
Accipitridae	Elanus axillaris	Black-shouldered Kite
	Aquila audax	Wedge-tailed Eagle
Falconidae	Falco cenchroides	Nankeen Kestrel
	Falco berigora	Brown Falcon
Turnicidae	Turnix varius	Painted Button-quail
Cacatuidae	Calyptorhynchus latirostris	Carnaby's Black-Cockatoo
	Eolophus roseicapillus	Galah
Psittacidae	Glossopsitta porphyrocephala	Purple-crowned Lorikeet
Cuculidae	Chalcites basalis	Horsfield's Bronze-Cuckoo
	Cacomantis flabelliformis	Fan-tailed Cuckoo
Maluridae	Malurus pulcherrimus	Blue-breasted Fairywren
Acanthizidae	Sericornis frontalis	White-browed Scrubwren
	Hylacola cauta	Shy Heathwren
	Smicrornis brevirostris	Weebill
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Acanthiza apicalis	Inland Thornbill
Pardalotidae	Pardalotus punctatus	Spotted Pardalote
	Pardalotus striatus	Striated Pardalote
Meliphagidae	Acanthorhynchus superciliosus	Western Spinebill
	Lichenostomus cratitius	Purple-gaped Honeyeater
	Manorina flavigula	Yellow-throated Miner
	Anthochaera lunulata	Western Wattlebird
	Anthochaera carunculata	Red Wattlebird
	Glyciphila melanops	Tawny-crowned Honeyeater
	Lichmera indistincta	Brown Honeyeater
	Phylidonyris novaehollandiae	New Holland Honeyeater
	Phylidonyris niger	White-cheeked Honeyeater
	Melithreptus brevirostris	Brown-headed Honeyeater
Pomatostomidae	Pomatostomus superciliosus	White-browed Babbler
Eupetidae	Psophodes nigrogularis	Western Whipbird
Campephagidae	Coracina novaehollandiae	Black-faced Cuckoo-shrike
Pachycephalidae	Pachycephala pectoralis	Golden Whistler
	Colluricincla harmonica	Grey Shrike-thrush
	Oreoica gutturalis	Crested Bellbird
Artamidae	Cracticus torquatus	Grey Butcherbird
	Cracticus tibicen	Australian Magpie
	Strepera versicolor	Grey Currawong
Rhipiduridae	Rhipidura leucophrys	Willie Wagtail
Corvidae	Corvus coronoides	Australian Raven
Monarchidae	Grallina cyanoleuca	Magpie-lark
Petroicidae	Drymodes brunneopygia	Southern Scrub-robin
Timaliidae	Zosterops lateralis	Silvereye
Hirundinidae	Hirundo neoxena	Welcome Swallow
Estrildidae	Stagonopleura oculata	Red-eared Firetail
Motacillidae	Anthus novaeseelandiae	Australasian Pipit

Table 13. Birds recorded during the fauna monitoring program



4 **DISCUSSION**

4.1 Western Whipbirds

Western Whipbirds were recorded at eight of the 10 monitoring sites (Table 13). Western Whipbirds were heard calling at similar locations to previous surveys by Chapman (2000), Coffey Environments (2009), Biota Environmental Sciences (2000, 2005) and Terrestrial Ecosystems (2013, 2014). Chapman (2000) reported Western Whipbirds at 10 sites and Biota Environmental Sciences (2000, 2005) reported Western Whipbirds at 10 sites in 2000 and 2005 respectively and Chapman, working for Coffey Environments, again recorded Western Whipbirds at three sites in 2009 (Table 14). Western Whipbirds therefore appear to be relatively abundant in the undisturbed and recently unburnt areas adjacent to the mine site.

Tuble I il Record of conservation significant species in recent surveys													
Species Year	99/00	2000	2005	2009	2010	2013	2014	2015					
Western Whipbirds (sites)	10	10	3	3		10	8 sites	8 sites					
Malleefowl	4	2			1		2						
Western Mouse	17	2	4		2								
Heath Rat	2	1			1								
Southern Brown Bandicoot	1			1									
Chuditch					10			5 sites					

 Table 14. Record of conservation significant species in recent surveys

4.2 Mammals

No Western Mice, Heath Rats or Southern Brown Bandicoots were caught or observed in the 2015 survey. House Mice, Mitchell's Hopping Mice and Ash Grey Mice were caught in 2014 but were not caught in 2015, and the number of Bush Rats caught has decreased again from 16 in 2013 to 6 in 2014 to one in 2015 (Table 15). Of interest, one cat was caught in 2013, three cats were caught in 2014 and two cats were caught in 2015. Cats were visually recorded at all sites and foxes at five of six sites. This is the same as for 2014.

Images of Chuditch were recorded by cameras at sites D20, D40, D70, D80, D90, F21, F25, seven of the cameras on the hill and one in the gully. Chuditch had not previously been recorded using cameras. These data indicate an increase in the number of Chuditch in the project area.

Species	Common Name	2013	2014	2015
Felis catus	Cat	1	3	2
Mus musculus	House Mouse	5	5	0
Notomys mitchellii	Mitchell's Hopping Mouse	2	1	0
Pseudomys albocinereus	Ash Grey Mouse	1	1	0
Rattus fuscipes	Bush Rat	16	6	1
Sminthopsis griseoventer	Grey-bellied Dunnart	1	0	0
Tachyglossus aculeatus	Echidna	1	0	0

Table 15. Comparison of the number of mammals caught in the 2013 and 2104 monitoring surveys

Given the trapping effort (i.e. 2,500 aluminium trap nights and 500 wire cage trap nights) the number of mammals caught is very low, and is progressively decreasing.

A reduction in the number of conservation significant species below the detectable minimum could be a valid reason for not catching any of these animals. It is interesting to note that Chapman (2000) recorded 17 Western Mice and six Heath Rats, Biota Environmental Sciences (2000, 2005) caught two Western Mice and one Heath Rat in 2000, and four Western Mice in 2005, Coffey Environments caught no Western Mice or Heath Rats in 2009 and two Western Mice and one Heath Rat in 2010. Terrestrial Ecosystems (2013) caught no conservation significant mammals during the three monitoring surveys in 2013, 2014 and 2015. Chuditch had been seen in the project area before the first capture in 2010, but had not previously been caught, and only two Southern Brown Bandicoots have been caught, one in 2000 and the other in 2009.



Cooper et al. (2003) reported the Heath Rat in Western Australia to have a preference for long-unburnt areas (30-70 years) which contrasts with the same species in Victoria that has a preference for post-fire regrowth (Cockburn et al. 1981). Heath Rats are either rare across its range or difficult to trap. For example, Cooper et al. (2003) cited survey work in the Fitzgerald Biosphere Reserve between 1993 and 2001, with 77 captures from 11 sites from 4,460 aluminium box trap-nights and 1,494 pit trap-nights.

4.2.1 Trapping effort

The total trapping effort of 2,500 aluminium box trap-nights and 500 cage trap-nights significantly exceeds the trapping effort of Chapman (2000) and Biota Environmental Sciences (2000, 2005) and is comparable with Coffey Environments (2009, 2010) 1,680 aluminium box trap-nights and 560 cage trap nights in 2009 and 2,520 aluminium box trap-nights in 2010 (Table 16 and 17). It appears as if the trapping effort was adequate and it is not the reason for the lack of captures of conservation significant fauna.

		Trap Type	е				
Sites or Habitat Type	Site Code	No Sites	Bucket pit- trap nights	Pipe pit- trap nights	Funnel trap nights	Elliott trap nights	Cage traps
Heath on sand/laterite	Н	5	420	420	840	420	140
Creek lines with dense vegetation	CK	5	420	420	840	420	140
Regrowth mallee on sand/rock/lateritic rock	ML	5	420	420	840	420	140
Mallee on sand/rock/lateritic rock	Μ	5	420	420	840	420	140
Total		20	1,680	1,680	3,360	1,680	560
Conservation significant fauna							
Heath Rat							
Western Mouse							
Southern Brown Bandicoot							1
Chuditch							

Table 16 Trapping effort for the Coffey Environment (2009)

				Тгар Туре				
Sites or Habitat Type	Site Code	No Sites	Bucket pit- trap nights	Pipe pit- trap nights	Funnel trap nights	Elliott trap nights	Cage traps	
Heath on sand/laterite	Н	5	420	420	840	420		
Creek lines with dense vegetation	CK	5	420	420	840	420		
Regrowth mallee on sand/rock/lateritic rock	ML	5	420	420	840	420		
Mallee on sand/rock/lateritic rock	Μ	5	420	420	840	420		
	Ν	10	798	798	1,680	840		
	Cages	4					420	
Total		20	2,478	2,478	5,040	2,520	420	
Conservation significant fauna								
Heath Rat				1				
Western Mouse				2				
Southern Brown Bandicoot								
Chuditch							10	

Table 17 Trapping effort for the Coffey Environment (2010)

Terrestrial Ecosystems monitoring program has used the same number of traps in the same location for the past three years, and there has been a steady decline in the number of small native mammals caught and observed.



4.2.2 Trap locations

Trapping locations were selected based on where Western Mice, Heath Rats, Chuditch and Southern Brown Bandicoots had been previously caught. Chuditch are reported to move considerable distances at Forrestania (Rayner et al. nd) and are therefore likely to be caught over a large area if they are present.

4.2.3 Bait

The bait used to trap the Western Mouse and Heath Rat is widely used and there is no evidence to indicate that it was unsuitable (Cockburn 1978, Quinlan et al. 2004). Wayne et al. (2008) concluded that chicken frames were superior to the universal bait for Chuditch, and Terrestrial Ecosystems routinely uses white bread and peanut butter to trap Southern Brown Bandicoots. Paull et al. (2011) compared three bait types for attracting small mammals to cameras: peanut butter with rolled oats, black truffle oil and live mealworms in bran. Overall, they concluded that peanut butter and rolled oats was a significantly superior bait type for *Antechinus, Isoodon, Perameles* and *Rattus*, relative to a control bait. Chuditch were attracted to bait pods containing sardines, rolled oats, peanut butter and mullie oil. So it does not appear as if the bait used was an issue.

4.2.4 Trap type

It is not known in what trap type the Western Mice and Heath Rats were caught in during the Chapman (2000) and Biota Environmental Sciences (2000, 2005) surveys, however, Coffey Environments caught both species in pipe pit-traps in 2010. Rodents are often targeted using aluminium box traps (Quinlan et al. 2004), however, based on a single survey by Coffey Environments (2010), the non-use of pit-traps may have been a factor in not catching Western Mice and Heath Rats.

4.2.5 Seasonal population fluctuations and fire

As discussed above, Dickman et al. (1999) reported all species of rodents monitored over a period of 7-9 years fluctuated dramatically, from being absent or in low numbers during droughts and erupting after rainfall. If Heath Rats and Western Mice are in low numbers in years when resources are plentiful or after a major wide spread fire, then it might be expected that they would be almost undetectable in years when resources were limited. Rainfall in 2014 and early in 2015 has been sufficient to have an abundance of native plants flower, so if this is an indication of the available resources, then resources should not have been a limiting factor.

Much of the project area was significantly impacted by a severe fire in 2003, but this did not affect all areas. This fire might account for a reduction in Malleefowl, Heath Rat and Western Mice in areas that were burnt and adjacent areas. The regeneration of habitat in fire affected areas appears suitable to support all three species, but if source populations are not present, then their numbers will not increase until animals move in from adjacent areas.

Southern Brown Bandicoot numbers can be influenced by predation and a loss of suitable habitat. Coates and Wright (2003), for example, indicated that Southern Brown Bandicoots are susceptible to predation by foxes and cats, both of which are present in the project area.

4.2.6 Predators

When a reduction in the number of Western Mice and Heath Rat is considered in conjunction with a possible decline in Malleefowl and Southern Brown Bandicoots this could suggest that predators are having a significant impact. The EPBC Species Profile and Threats Database documentation for the Heath Rat (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=77) reported habitat loss and fragmentation, inappropriate fires and the cat and fox as significant predators as the primary threats, and for the Malleefowl (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=934) a loss of vegetation. habitat fragmentation and predation by foxes. The DPaW brochure (http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=3&ved=0CDYQFjAC&url= http%3A%2F%2Fwww.dec.wa.gov.au%2Fpublications%2Fdoc_download%2F148-westernmouse.html&ei=DyBFUp3rJon8iQfr5IDYAw&usg=AFQjCNEvS7SqONLasg-Machy-



NxoyYxk9g&bvm=bv.53217764,d.aGc) on the Western Mouse indicates habitat loss, changed fire regimes and possibly introduced predators are the main threats.

The presence of introduced predators, in particular the cat and fox, were surveyed using camera traps, and cats were recorded at every site and foxes at all but one site. Exploration activity that clears numerous tracks through the relatively dense undergrowth enables both of these two species to have much better access to a greater range of habitats. This access can result in a high level of predation which in turn leads to increased predator numbers.

4.3 Malleefowl

Malleefowl were reported by Chapman (2000) and Biota Environmental Sciences (2000) and a single bird was seen in 2010 by Coffey Environments (2010). The Coffey Environments (2009) and Terrestrial Ecosystems (2013) surveys covered large areas and habitat that was suitable for Malleefowl but they were not seen. The known Malleefowl mounds in the area were destroyed with the development of Halley's pit, waste dumps and tailings storage facilities. These data, although not systematically recorded, would suggest a decline in the number of Malleefowl in the project area that probably coincides with the widespread 2003 fire.

Malleefowl were recorded at two camera locations and on Mason Road during the 2014 survey, however, they were not recorded during the 2015 survey. With a small population in the area, observation of malleefowl will be infrequent, and the change between 2014 and 2015 may reflect error variance in observations.

4.4 Western Brush Wallaby

Western Brush Wallabies (*Macropus irma*) were recorded at all camera survey sites. At many of these sites they were seen on multiple occasions. Some of these occasions would have been the same individual returning to the area or being recorded on multiple cameras deployed at a site. Western Brush Wallabies are breeding in the area, as multiple female wallabies with pouch young were recorded on the camera traps.

4.5 Chuditch

The 50 motion and infrared sensitive camera traps recorded Chuditch at multiple locations in the 2015 survey. Seven of the 10 cameras on the hill recorded Chuditch, which was the site that Coffey recorded them in 2010. They were recorded on one camera in the gully, again at a site where they were recorded by Coffey in 2010. They were also recorded on five cameras at site D and two cameras at site F.

Chuditch numbers fluctuate and they are predated on by foxes. It is likely that there has been an increase in the local population in the last year as they are now being recorded at multiple locations.

4.6 Cats and foxes

Cats were recorded by motion and infrared sensitive camera traps at all sites and foxes were present in all sites except on the hill where the Chuditch were caught in 2010 by Coffey and recorded by camera traps in 2015. In addition, two cats were caught in traps.

Burbidge (2004), in his book on threatened animals in Western Australia, indicated that the fox was a known predator of Chuditch, Heath Rat and Malleefowl, and the cat is a known threat to the Heath Rat. The national recovery plan for Malleefowl (Benshemesh 2007) records the fox, and to a lesser extent cats and raptors as a major cause of mortality of Malleefowl. Similarly, the national recovery plan for Chuditch lists predation by, and competition from, feral dogs, foxes and feral cats among other factors contributing to its decline.

An effective cat and fox management program should see a significant long-term increase in the malleefowl and Chuditch, and perhaps Southern Brown Bandicoots, Ash Grey Mice, Heath Rat and Western Mouse if residual populations still exist in the area.



Care needs to be exercised in baiting for foxes, as a significant decline in fox numbers could result in an increase in the number of cats (i.e. mesopredator release), which is highly undesirable. Therefore any management program to reduce fox numbers needs to be done in conjunction with a similar program to reduce the cat population.



5 CONCLUSIONS AND RECOMMENDATIONS

A baseline monitoring program for the Heath Rat, Western Mouse, Southern Brown Bandicoot and Western Whipbirds was established in 2013 and 50 camera traps were deployed during the 2014 survey to establish baseline data that can now be used to monitor changes in the population of Western Brush Wallabies, Malleefowl, Chuditch, cats and foxes. The 2014 and 2015 survey results provide an indication of the number of mammals in the vicinity of the RNO project area.

The lack of captures for Heath Rat, Western Mouse and Southern Brown Bandicoot, and the recent decline in the number of Ash Grey Mouse, Mitchell's Hopping Mouse and Bush Rat is of concern and suggests that feral predators are having a significant impact on the small native mammal population.

Western Whipbirds are present in numerous locations that have not been recently burnt, with calls heard at a similar number of sites to that reported by Chapman (2000) and Terrestrial Ecosystems (2013, 2014).

The records of Malleefowl in 2014 were a good sign that their population in the project area was increasing, however, no malleefowl were recorded in the 2015 survey. Foxes, and to a lesser extent cats can predate on Malleefowl and their abundance is likely to place continual pressure of the survival of the Malleefowl around the mine.

5.1 Recommendation

There has been a noticeable decline in small mammals in the project area since part of the area was burnt in 2003, but this decline has continued in recent years to the point where only a single native mammal was caught in 2,500 aluminium box trap-nights and 500 wire cage trap-nights. The non-capture of Heath Rats, Western Mice and Southern Brown Bandicoot since the surveys by Chapman (2000), Biota Environmental Sciences (2000, 2005) and Coffey (2009, 2010) is an additional indication of the loss of small mammals from the project area.

The low abundance of conservation significant small mammals is likely to be due, in part, to predation by the abundance of cats and foxes in the project area. A long-term and sustained cat and fox management program is required to reverse this trend.

Recommendation 1. An effective cat and fox reduction program is developed and implemented for the project area.



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Appendix A Trapping sites, Western Whipbird listening locations and camera trap locations



Datum	GDA94		Datum	GDA94		Datum	GDA94	
Site	Latitude	Longitude	Site	Latitude	Longitude	Site	Latitude	Longitude
A1	-33.576500	120.305000	A59	-33.585760	120.326660	C15	-33.660890	120.396910
A2	-33.576420	120.304970	AC11	-33.585750	120.326650	CC3	-33.660890	120.396900
AC1	-33.576330	120.305000	A60	-33.585850	120.326660	C16	-33.660950	120.396920
A3	-33.576340	120.305000	AC12	-33.585850	120.326650	C17	-33.661000	120.396920
A4	-33.576280	120.305020	AC13	-33.585930	120.326680	C18	-33.661070	120.396870
AC2	-33.576220	120.305000	A61	-33,585930	120.326670	C19	-33.661150	120.396880
A5	-33.576210	120 305010	A62	-33,586000	120.326600	C20	-33,661190	120.396880
AC3	-33.576150	120 305020	AC14	-33 586000	120.326600	CC4	-33.661210	120.396870
A6	-33.576160	120.305030	A63	-33,586080	120.326600	C21	-33.661240	120.396870
A7	-33.576100	120 305040	A64	-33 586130	120 326610	C22	-33,661310	120.396840
AC4	-33,576030	120.305030	A65	-33,586200	120.326620	C23	-33 661370	120.396830
A8	-33 576020	120.305010	AC15	-33 586200	120.326600	C24	-33 661420	120.396830
49	-33 575970	120.305010	A66	-33 586280	120.326590	C25	-33 661480	120.396830
A10	-33 575910	120.305040	A67	-33 586370	120.326590	CC5	-33 661480	120.396820
AC5	-33 575910	120.305030	A68	-33 586460	120.326590	C26	-33 661540	120.396830
A11	-33 575820	120.305030	A69	-33 586530	120.326560	C27	-33 661590	120.396800
AC6	-33 575830	120.305030	A70	-33 586590	120.326580	C28	-33.661660	120.396800
A12	-33 575750	120.305030	AC16	-33 586590	120.326580	C20	-33 661700	120.396810
A13	-33 575690	120.305030	A71	-33 586660	120.326570	C30	-33 661750	120.396800
A13	-33 575630	120.305020	Δ72	-33 586730	120.326590	CC6	-33 661750	120.396800
A14 AC7	33 575640	120.305040	A72	33 586820	120.326590	C21	-33.001730	120.390800
AC7	33 575570	120.305040	A74	33 586870	120.326510	C31	33 661840	120.390800
Δ16	-33.575400	120.305040	Δ75	-33.586040	120.326620	C32	-33.661000	120.390000
A10	-33.373490	120.303040	A75	-33.380940	120.320020	C33	-33.001880	120.390770
AT/	-55.575450	120.303030	A/0	-33.387010	120.320010	C34	-33.001930	120.390700
AC0	-33.373430	120.305030	AC17	-33.387020	120.320010	C33	-33.001980	120.390770
A10	-33.373380	120.305020	A79	-33.387100	120.320000	C26	-33.001980	120.390700
A19	-33.373280	120.303030	A70	-33.387130	120.320010	C30	-33.002040	120.390700
AC9	-55.575290	120.303030	A79	-35.387230	120.326570	C37	-33.002110	120.390730
A20	-55.575200	120.303030	A80	-33.387290	120.326570	C38	-33.002140	120.390730
A21	-55.575130	120.303030	A01	-35.38/3/0	120.326570	C39	-33.002200	120.390730
AC10	-33.5/5130	120.305040	A82	-33.58/440	120.326570	C40	-33.002280	120.396730
A22	-33.575090	120.305040	AC18	-33.58/430	120.326570	<u>CC8</u>	-33.002280	120.396710
A23	-55.575010	120.303030	A65	-33.387490	120.326570	C41	-33.002320	120.390710
A24	-33.574930	120.305050	A84	-33.58/5/0	120.326550	C42	-33.002380	120.396700
A25	-33.5/48/0	120.305050	A85	-33.58/620	120.326540	C43	-33.662400	120.396700
A20	-33.574810	120.305040	A80	-33.58/720	120.326550	C44	-33.002430	120.390090
A27	-33.574740	120.305040	A8/	-33.587790	120.326550	C45	-33.062490	120.390090
A28	-33.574630	120.305060	AC19	-33.58/7/0	120.326550	016	-33.662490	120.396690
A29	-33.574500	120.305060	A88	-33.58/830	120.326560	C46	-33.662560	120.396700
A30	-33.574410	120.305050	A89	-33.58/910	120.326530	C47	-33.662600	120.396690
A31	-33.574350	120.305050	A90	-33.58/980	120.326530	C48	-33.662660	120.396660
A32	-33.574270	120.305080	A91	-33.588030	120.326530	C49	-33.662/00	120.396660
A33	-33.574190	120.305070	A92	-33.588120	120.326490	C50	-33.662/50	120.396660
A34	-33.574110	120.305070	A93	-33.588250	120.326490	CC10	-33.662750	120.396660
A35	-33.574040	120.305060	A94	-33.588350	120.326430	C51	-33.662790	120.396640
A36	-33.573970	120.305080	A95	-33.588440	120.326430	C52	-33.662840	120.396640
A37	-33.573900	120.305080	A96	-33.588510	120.326430	053	-33.662900	120.396620
A38	-33.573820	120.305080	A9/	-33.588580	120.326390	054	-33.662930	120.396620
A39	-33.573750	120.305070	A98	-33.588620	120.326390	055	-33.663080	120.396490
A40	-33.573680	120.305090	A99	-33.588690	120.326400	CCII	-33.663080	120.396490
A41	-33.573590	120.305100	A100	-33.588750	120.326410	C56	-33.663080	120.396410
A42	-33.573480	120.305090	AC20	-33.588750	120.326410	C57	-33.663100	120.396390
A43	-33.573380	120.305130	C1	-33.660000	120.397060	C58	-33.663160	120.396310
A44	-33.573270	120.305120	C2	-33.660090	120.397040	C59	-33.663190	120.396270
A45	-33.573200	120.305110	C3	-33.660160	120.397030	C60	-33.663210	120.396200
A46	-33.573120	120.305100	C4	-33.660260	120.397050	CC12	-33.663210	120.396230
A47	-33.573080	120.305100	C5	-33.660280	120.397030	C61	-33.663220	120.396140
A48	-33.573000	120.305120	CC1	-33.660290	120.397000	C62	-33.663250	120.396110
A49	-33.572920	120.305110	C6	-33.660370	120.396990	C63	-33.663260	120.396040
A50	-33.572820	120.305110	C7	-33.660440	120.396990	C64	-33.663270	120.396020
A51	-33.585280	120.326210	C8	-33.660480	120.396990	C65	-33.663290	120.395990
A52	-33.585310	120.326300	C9	-33.660560	120.396950	CC13	-33.663290	120.396000
A53	-33.585400	120.326380	C10	-33.660620	120.396940	C66	-33.663330	120.395920
A54	-33.585450	120.326450	CC2	-33.660620	120.396940	C67	-33.663360	120.395890
A55	-33.585500	120.326510	C11	-33.660660	120.396950	C68	-33.663380	120.395820
A56	-33.585540	120.326580	C12	-33.660730	120.396950	C69	-33.663400	120.395800
A57	-33.585630	120.326660	C13	-33.660790	120.396910	C70	-33.663410	120.395760
A58	-33.585720	120.326670	C14	-33.660860	120.396900	CC14	-33.663410	120.395760



Datum	GDA94		Datum	GDA94		Datum	GDA94	
Site	Latitude	Longitude	Site	Latitude	Longitude	Site	Latitude	Longitude
C71	-33.663450	120.395690	D28	-33.659250	120.375610	D85	-33.660350	120.372720
C72	-33.663470	120.395650	D29	-33.659270	120.375580	DC17	-33.660350	120.372720
C73	-33.663510	120.395590	D30	-33.659290	120.375500	D86	-33.660380	120.372700
C74	-33.663530	120.395570	DC6	-33.659310	120.375540	D87	-33.660410	120.372630
C75	-33.663580	120.395460	D31	-33.659300	120.375470	D88	-33.660420	120.372620
CC15	-33.663580	120.395450	D32	-33.659320	120.375420	D89	-33.660440	120.372570
C76	-33.663600	120.395410	D33	-33.659360	120.375350	D90	-33.660460	120.372500
C77	-33.663610	120.395340	D34	-33.659360	120.375320	DC18	-33.660450	120.372540
C78	-33.663650	120.395310	D35	-33.659400	120.375250	D91	-33.660470	120.372480
C79	-33.663680	120.395240	DC7	-33.659410	120.375250	D92	-33.660480	120.372440
C80	-33.663700	120.395210	D36	-33.659430	120.375220	D93	-33.660500	120.372390
CC16	-33.663680	120.395220	D37	-33.659430	120.375180	D94	-33.660550	120.372350
C81	-33.663710	120.395190	D38	-33.659450	120.375120	D95	-33.660550	120.372320
C82	-33.663720	120.395150	D39	-33.659490	120.375080	DC19	-33.660540	120.372310
C83	-33.663720	120.395110	D40	-33.659490	120.375000	D96	-33.660550	120.372250
C84	-33.663740	120.395080	DC8	-33.659500	120.374990	D97	-33.660580	120.372210
C85	-33.663770	120.395060	D41	-33.659500	120.374940	D98	-33.660600	120.372140
C86	-33.663790	120.395010	D42	-33.659530	120.374880	D99	-33.660610	120.372090
C87	-33.663790	120.394980	D43	-33.659540	120.374840	D100	-33.660650	120.372030
C88	-33.663820	120.394950	D44	-33.659560	120.374780	DC20	-33.660650	120.372020
C89	-33.663850	120.394870	D45	-33.659590	120.374740	E1	-33.654960	120.357160
C90	-33.663890	120.394800	DC9	-33.659600	120.374740	E2	-33.654970	120.357200
CC17	-33.663780	120.395030	D46	-33.659590	120.374700	E3	-33.654990	120.357240
CC18	-33.663870	120.394830	D47	-33.659610	120.374630	E4	-33.655010	120.357300
C91	-33.663900	120.394750	D48	-33.659660	120.374600	E5	-33.655050	120.357370
C92	-33.663950	120.394690	D49	-33.659660	120.374540	EC1	-33.655050	120.357380
C93	-33.663970	120.394620	D50	-33.659660	120.374520	E6	-33.655090	120.357430
C94	-33.664030	120.394550	DC10	-33.659680	120.374520	E7	-33.655110	120.357500
C95	-33.664030	120.394490	D51	-33.659690	120.374470	E8	-33.655130	120.357540
CC19	-33.664030	120.394490	D52	-33.659710	120.374410	E9	-33.655150	120.357600
C96	-33.664060	120.394420	D53	-33.659730	120.374370	E10	-33.655170	120.357690
C97	-33.664110	120.394370	D54	-33.659750	120.374340	EC2	-33.655160	120.357690
C98	-33.664140	120.394300	D55	-33.659770	120.374280	E11	-33.655190	120.357740
C99	-33.664160	120.394220	DC11	-33.659770	120.374290	E12	-33.655210	120.357810
C100	-33.664180	120.394170	D56	-33.659790	120.374250	E13	-33.655260	120.357880
CC20	-33.664190	120.394180	D57	-33.659820	120.374180	E14	-33.655300	120.357910
D1	-33.658740	120.376930	D58	-33.659840	120.374160	E15	-33.655330	120.358010
D2	-33.658780	120.376890	D59	-33.659840	120.374120	EC3	-33.655330	120.358010
D3	-33.658780	120.376800	D60	-33.659850	120.374050	E16	-33.655350	120.358060
D4	-33.658790	120.376760	DC12	-33.659880	120.374050	E17	-33.655360	120.358130
D5	-33.658830	120.376700	D61	-33.659890	120.374000	E18	-33.655410	120.358190
DC1	-33.658830	120.376700	D62	-33.659890	120.373980	E19	-33.655410	120.358250
D6	-33.658830	120.376650	D63	-33.659900	120.373920	E20	-33.655440	120.358300
D7	-33.658850	120.376630	D64	-33.659950	120.373830	EC4	-33.655440	120.358310
D8	-33.658860	120.376560	D65	-33.659950	120.373800	E21	-33.655490	120.358350
D9	-33.658870	120.376530	DC13	-33.659960	120.373800	E22	-33.655500	120.358390
D10	-33.658900	120.376490	D66	-33.659970	120.373790	E23	-33.655520	120.358470
DC2	-33.658910	120.376500	D67	-33.660000	120.373740	E24	-33.655530	120.358520
D11	-33.658930	120.376410	D68	-33.660020	120.373670	E25	-33.655550	120.358590
D12	-33.658940	120.376370	D69	-33.660020	120.373620	EC5	-33.655550	120.358600
D13	-33.658950	120.376300	D70	-33.660050	120.373580	E26	-33.655570	120.358650
D14	-33.658990	120.376260	DC14	-33.660070	120.373570	E27	-33.655590	120.358690
D15	-33.659000	120.376200	D71	-33.660070	120.373530	E28	-33.655640	120.358730
DC3	-33 659000	120.376200	D72	-33 660070	120.373460	E29	-33 655640	120.358810
D16	-33 659050	120.376170	D73	-33,660110	120.373420	E30	-33,655680	120.358890
D17	-33 659070	120.376150	D74	-33 660120	120.373350	EC6	-33,655680	120.358890
D18	-33.659070	120.376080	D75	-33.660120	120.373310	E31	-33.655720	120.358970
D19	-33.659110	120.376040	DC15	-33,660150	120.373300	E32	-33,655730	120.359020
D20	-33,659110	120.375980	D76	-33,660180	120.373260	E33	-33,655750	120.359110
DC4	-33.659120	120.375960	D77	-33.660180	120.373200	E35	-33.655770	120.359160
D21	-33 659120	120.375930	D78	-33 660220	120.373180	E35	-33,655810	120.359210
D22	-33 659130	120 375890	D79	-33 660240	120.373130	EC7	-33,655800	120.359240
D23	-33 659160	120.375840	D80	-33 660240	120.373050	E36	-33,655860	120.359310
D24	-33,659190	120.375820	DC16	-33,660240	120.373060	E37	-33,655870	120.359350
D25	-33 659180	120.375780	D81	-33 660280	120.372960	E38	-33,655900	120.359400
DC5	-33 659180	120.375780	D82	-33 660300	120.372920	E39	-33,655920	120.359470
D26	-33 659100	120.375720	D83	-33 660300	120.372840	E39	-33 655940	120.359520
D27	-33 659240	120.375680	D84	-33 660340	120.372800	EC8	-33,655940	120.359520



Datum	GDA94		Datum	GDA94		Datum	GDA94	
Site	Latitude	Longitude	Site	Latitude	Longitude	Site	Latitude	Longitude
E41	-33.655960	120.359570	E98	-33.657420	120.363080	G47	-33.668280	120.379730
E42	-33.655970	120.359650	E99	-33.657450	120.363140	G46	-33.668280	120.379640
E43	-33.656000	120.359720	E100	-33.657470	120.363200	G45	-33.668290	120.379580
E44	-33.656040	120.359800	EC20	-33.657470	120.363220	GC45	-33.668290	120.379580
E45	-33.656100	120.359860	F1	-33.624650	120.387430	G44	-33.668280	120.379480
EC9	-33.656090	120.359870	FC1	-33.624660	120.387420	G43	-33.668290	120.379390
E46	-33.656120	120.359940	F2	-33.624670	120.387360	G42	-33.668280	120.379260
E47	-33.656130	120.360000	F3	-33.624730	120.387310	G41	-33.668280	120.379150
E48	-33.656150	120.360060	F4	-33.624810	120.387250	G40	-33.668270	120.379050
E49	-33.656170	120.360130	F5	-33.624860	120.387200	GC40	-33.668280	120.379060
E50	-33.656200	120.360200	F6	-33.624900	120.387170	G39	-33.668280	120.378990
EC10	-33.656200	120.360200	FC2	-33.624900	120.387170	G38	-33.668250	120.378880
E51	-33.656240	120.360230	F7	-33.624960	120.387130	G37	-33.668250	120.378760
E52	-33.656270	120.360300	F8	-33.624990	120.387060	G36	-33.668260	120.378640
E53	-33.656290	120.360350	F9	-33.625030	120.387050	G35	-33.668260	120.378540
E55	-33.656310	120.360440	F10	-33.625060	120.387040	GC35	-33.668260	120.378540
E55	-33.656340	120.360520	F11	-33.625120	120.387010	G34	-33.668250	120.378440
EC11	-33.656340	120.360530	FC3	-33.625120	120.387010	G33	-33.668250	120.378350
E56	-33.656360	120.360550	F12	-33.625150	120.386950	G32	-33.668230	120.378250
E57	-33 656380	120.360640	F13	-33 625190	120.386920	G31	-33.668230	120.378190
E58	-33 656410	120.360670	F14	-33 625230	120.386860	G30	-33.668230	120.378060
E59	-33 656450	120.360730	F15	-33 625240	120.386840	GC30	-33 668230	120.378070
E60	-33.656480	120.360810	F16	-33 625270	120.386800	G29	-33,668230	120.377970
E00 FC12	-33 656470	120.360810	FC4	-33 625280	120.386770	G28	-33 668240	120.377880
E61	-33 656500	120.360850	F17	-33 625360	120.386740	G27	-33 668240	120.377840
E62	-33 656520	120.360930	F18	-33 625380	120.386700	G26	-33 668220	120.377770
E62	-33 656530	120.360990	F19	-33 625460	120.386640	G25	-33 668230	120.377680
E03	-33 656560	120.361040	F20	-33 625530	120.386570	GC25	-33 668210	120.377660
E65	-33.656600	120.361130	F21	-33 625590	120.386530	G24	-33 668200	120.377570
E03	-33 656580	120.361130	FC5	-33 625580	120.386520	G23	-33.668200	120.377490
EC15 E66	-33 656610	120.361160	F22	-33 625610	120.386460	G23	-33 668210	120.377380
E00	-33.656640	120.361220	F23	-33.625660	120.386440	G21	-33 668200	120.377300
E67	-33.656670	120.361220	F24	-33.625660	120.386360	G20	-33.668200	120.377300
E60	-33 656700	120.361350	F25	-33 625720	120.386310	GC20	-33 668190	120.377240
E09	-33 656700	120.361410	F26	-33 625900	120.385850	G19	-33 668190	120.377140
E70 FC14	-33 656700	120.361410	FC6	-33 625900	120.385840	G18	-33 668180	120.377070
EC14 F71	-33 656720	120.361470	F27	-33 625940	120.385750	G17	-33 668180	120.376950
E71 E72	-33 656750	120.361530	F28	-33 625940	120.385690	G16	-33 668170	120.376930
E72 F73	-33 656790	120.361600	F29	-33 625960	120.385590	G15	-33 668170	120.376810
E74	-33 656830	120.361660	F30	-33 625970	120.385480	GC15	-33 668170	120.376790
E74 F75	-33 656850	120.361710	F31	-33 625990	120.385420	G14	-33 668170	120.376730
EC15	-33 656840	120.361710	FC7	-33 625990	120.385410	G13	-33 668170	120.376670
EC15 F76	-33 656890	120.361800	F32	-33 625980	120.385320	G12	-33 668160	120.376580
E70	-33 656900	120.361840	F33	-33 626020	120.385220	G11	-33 668150	120.376530
E77	-33 656910	120.361880	F34	-33.626030	120.385160	G10	-33 668150	120.376450
E70	-33 656920	120.361940	F35	-33 626030	120.385070	GC10	-33 668140	120.376460
E79	-33.656940	120.361940	F36	-33.626050	120.385000	G010	-33 668150	120.376400
EC16	-33.656940	120.361990	FC8	-33 626070	120.384990	G8	-33.668160	120.376340
E81	-33,656970	120.362030	F37	-33 626060	120.384910	G7	-33.668150	120 376300
E82	-33 656990	120.362110	F38	-33 626060	120.384850	G6	-33 668150	120.376230
E83	-33.657030	120.362160	F39	-33 626110	120.384710	65	-33.668150	120.376150
E84	-33 657070	120.362200	F40	-33 626100	120.384620	GC5	-33 668150	120.376150
E04 E85	-33.657080	120.362200	F41	-33.626140	120.384550	G4	-33 668130	120.376100
E03	-33 657070	120.362290	FC9	-33 626150	120.384550	G3	-33 668130	120.376000
EC17	-33 657090	120.362320	F42	-33.626150	120.384450	G2	-33 668150	120.375930
E80 E87	33 657110	120.362320	F42	33 626140	120.384300	G1	33 668120	120.375930
E87	33.657140	120.302380	F43	33 626180	120.384390	CM 1	33 576500	120.375850
E88	33 657170	120.362400	F44	33 626180	120.384300	CM-1 CM 2	33 576320	120.305010
E09	-33 657100	120.302490	F46	-33.626100	120.384120	CM-2	-33 576200	120.305010
E90 EC18	-33,657210	120.302300	FC10	-33.626190	120.304120	CM 4	-33 585620	120.305000
EC10 E01	-33.037210	120.302390	F47	-33.020200	120.304000	CM 5	-33.363030	120.320070
E91 E02	-33.037230	120.302040	F47	-33.020220	120.304020	CM-5	-33.363630	120.320070
E92 E02	-33.03/200	120.302740	F40	-33.020220	120.303940	CIVI-0	-33.380000	120.320010
E93 E04	-33.03/280	120.302780	F49 E50	-33.020310	120.303910	CM °	-33.034900	120.337170
E94 E05	-33.03/310	120.302030	F50 C50	-33.020380	120.363620	CIVI-0	-33.033170	120.337090
E93	-33.03/340	120.302870	GC50	-33.008280	120.380030	CIVI-9	-33.033400	120.338270
EC19 E06	-33.03/330	120.302900	GC30	-33.008320	120.379990	CM-10	-33.033090	120.338900
E90 E07	-33.03/330	120.302930	G49	-33.008310	120.379900	CIVI-11 CM 12	-33.030080	120.339800
1.1.7/	-55.05/400	120.00000	0+0	-22.000200	120.317110	UNI-12	-55.050400	120.300020



Datum	GDA94		Datum	GDA94		Datum	GDA94	
Site	Latitude	Longitude	Site	Latitude	Longitude	Site	Latitude	Longitude
CM-13	-33.656720	120.361450	CM-29	-33.626100	120.384640	CM-45	-33.668330	120.377720
CM-14	-33.656930	120.361980	CM-30	-33.626230	120.383960	CM-46	-33.668150	120.377700
CM-15	-33.657180	120.362570	CM-31	-33.660460	120.369850	CM-47	-33.668010	120.377740
CM-16	-33.657470	120.363200	CM-32	-33.660110	120.369930	CM-48	-33.667800	120.377780
CM-17	-33.658730	120.376930	CM-33	-33.659920	120.370000	CM-49	-33.667700	120.377840
CM-18	-33.659110	120.375980	CM-34	-33.659750	120.369930	CM-50	-33.667510	120.377960
CM-19	-33.659290	120.375500	CM-35	-33.659610	120.369970	WB1	-33.658680	120.377000
CM-20	-33.659480	120.374970	CM-36	-33.659680	120.369650	WB2	-33.661890	120.368740
CM-21	-33.659660	120.374500	CM-37	-33.659860	120.369600	WB3	-33.654930	120.357090
CM-22	-33.659840	120.374040	CM-38	-33.660030	120.369560	WB4	-33.655120	120.367740
CM-23	-33.660030	120.373560	CM-39	-33.660230	120.369610	WB5	-33.668350	120.380940
CM-24	-33.660240	120.373060	CM-40	-33.660360	120.369680	WB6	-33.664230	120.394150
CM-25	-33.660470	120.372510	CM-41	-33.669170	120.377490	WB8	-33.585850	120.326760
CM-26	-33.625570	120.386550	CM-42	-33.668980	120.377600	WB9	-33.573810	120.325110
CM-27	-33.625710	120.386310	CM-43	-33.668740	120.377730	WB10	-33.576370	120.304930
CM-28	-33.625900	120.385840	CM-44	-33.668520	120.377820	WB11	-33.652160	120.350460



Appendix B Trapping results



Date	Trap No	Species	Common Name
14/10/2015	C2	Tiliqua rugosa	Bobtail
14/10/2015	CC1	Corvus coronoides	Australian Raven
14/10/2015	CC4	Tiliqua rugosa	Bobtail
14/10/2015	CC6	Felis catus	Cat
14/10/2015	CC11	Tiliqua rugosa	Bobtail
14/10/2015	CC15	Tiliqua rugosa	Bobtail
14/10/2015	CC17	Tiliqua rugosa	Bobtail
14/10/2015	CC18	Tiliqua rugosa	Bobtail
14/10/2015	C94	Tiliqua rugosa	Bobtail
14/10/2015	C98	Tiliqua rugosa	Bobtail
14/10/2015	CC20	Tiliqua rugosa	Bobtail
14/10/2015	DC6	Tiliqua occipitalis	Western Blue Tongue
14/10/2015	DC15	Tiliqua rugosa	Bobtail
14/10/2015	E79	Tiliqua rugosa	Bobtail
14/10/2015	EC19	Varanus rosenbergi	Rosenberg's Goanna
14/10/2015	EC20	Tiliqua rugosa	Bobtail
14/10/2015	GC10	Varanus rosenbergi	Rosenberg's Goanna
14/10/2015	GC20	Tiliqua rugosa	Bobtail
14/10/2015	G22	Tiliqua rugosa	Bobtail
14/10/2015	GC25	Tiliqua rugosa	Bobtail
14/10/2015	GC30	Varanus rosenbergi	Rosenberg's Goanna
14/10/2015	GC40	Tiliqua rugosa	Bobtail
14/10/2015	G48	Tiliqua rugosa	Bobtail
14/10/2015	GC50	Tiliqua rugosa	Bobtail
14/10/2015	G50	Tiliqua rugosa	Bobtail
14/10/2015	GC50	Tiliqua rugosa	Bobtail
14/10/2015	FC3	Tiliqua rugosa	Bobtail
14/10/2015	FC4	Varanus rosenbergi	Rosenberg's Goanna
14/10/2015	FC5	Tiliqua rugosa	Bobtail
14/10/2015	FC6	Tiliqua rugosa	Bobtail
14/10/2015	FC7	Tiliqua rugosa	Bobtail
15/10/2015	AC1	Tiliqua rugosa	Bobtail
15/10/2015	AC9	Tiliqua rugosa	Bobtail
15/10/2015	AC20	Tiliqua rugosa	Bobtail
15/10/2015	CC7	Tiliqua rugosa	Bobtail
15/10/2015	CC3	Tiliqua rugosa	Bobtail
15/10/2015	CC1	Tiliqua rugosa	Bobtail
15/10/2015	C1	Tiliqua rugosa	Bobtail
15/10/2015	CC10	Tiliqua rugosa	Bobtail
15/10/2015	CC13	Tiliqua rugosa	Bobtail
15/10/2015	CC15	Felis catus	Cat
15/10/2015	CC16	Tiliqua rugosa	Bobtail
15/10/2015	C93	Tiliqua rugosa	Bobtail
15/10/2015	CC20	Tiliqua rugosa	Bobtail
15/10/2015	D1	Tiliqua rugosa	Bobtail
15/10/2015	D9	Tiliqua rugosa	Bobtail
15/10/2015	DC6	Tiliqua rugosa	Bobtail
15/10/2015	DC7	Tiliqua rugosa	Bobtail
15/10/2015	DC8	Varanus rosenbergi	Rosenberg's Goanna
15/10/2015	D58	Tiliqua rugosa	Bobtail
15/10/2015	DC16	Corvus coronoides	Australian Raven
15/10/2015	DC18	Tiliqua rugosa	Bobtail
15/10/2015	EC3	Corvus coronoides	Australian Raven
15/10/2015	E56	Varanus rosenbergi	Rosenberg's Goanna



Date	Trap No	Species	Common Name
15/10/2015	E79	Tiliqua rugosa	Bobtail
15/10/2015	FC10	Tiliqua rugosa	Bobtail
15/10/2015	G32	Tiliqua rugosa	Bobtail
15/10/2015	G33	Tiliqua rugosa	Bobtail
15/10/2015	GC40	Strepera versicolor	Grey Currawong
15/10/2015	GC50	Tiliqua rugosa	Bobtail
16/10/2015	AC20	Tiliqua rugosa	Bobtail
16/10/2015	AC17	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	AC13	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	AC1	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	FC5	Tiliqua rugosa	Bobtail
16/10/2015	E93	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	EC18	Tiliqua rugosa	Bobtail
16/10/2015	EC16	Tiliqua rugosa	Bobtail
16/10/2015	EC16	Tiliqua rugosa	Bobtail
16/10/2015	EC15	Tiliqua rugosa	Bobtail
16/10/2015	EC6	Tiliqua rugosa	Bobtail
16/10/2015	EC6	Tiliqua rugosa	Bobtail
16/10/2015	EC1	Tiliqua rugosa	Bobtail
16/10/2015	AC11	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	DC7	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	DC15	Varanus rosenbergi	Rosenberg's Goanna
16/10/2015	GC50	Tiliqua rugosa	Bobtail
16/10/2015	GC35	Tiliqua occipitalis	Western Blue Tongue
16/10/2015	G42	Tiliqua rugosa	Bobtail
16/10/2015	G17	Tiliqua rugosa	Bobtail
16/10/2015	CC1	Tiliqua rugosa	Bobtail
16/10/2015	C7	Tiliqua rugosa	Bobtail
16/10/2015	CC3	Tiliqua rugosa	Bobtail
16/10/2015	C22	Tiliqua rugosa	Bobtail
16/10/2015	C31	Tiliqua rugosa	Bobtail
16/10/2015	<u>CC8</u>	Tiliqua rugosa	Bobtail
16/10/2015	C41	Tiliqua rugosa	Bobtail
16/10/2015		Tiliqua rugosa	Bobtail
16/10/2015	CC14	Tiliqua rugosa	Bobtail
16/10/2015	0017	Tiliqua rugosa	Bobtail
16/10/2015		Tuiqua rugosa	Bobtail
16/10/2015	AC1	Tuiqua rugosa	Bobtail
17/10/2015	ACI	Varanus rosenbergi T:l:	Rosenberg's Goanna
17/10/2015	AC3	Tuiqua rugosa	Boblall
17/10/2015		Varanus rosenbergi	Rosenberg's Goanna
17/10/2015	AC14	Varanus rosenbergi	Rosenberg's Goanna
17/10/2015	EC2	Varanus rosenbergi	Rosenberg's Goanna
17/10/2015		Tiligua mugosa	Rosenberg's Goanna
17/10/2015	E05	Tiliqua rugosa Tiliqua occipitalis	Western Blue Tongue
17/10/2015	E75 FC10	Varanus rosenharai	Rosenberg's Coanna
17/10/2015	FC6	Varanus rosenbergi	Rosenberg's Goanna
17/10/2015		Tiliaua rugosa	Robtail
17/10/2015	C40	Tiliaua rugosa	Bohtail
17/10/2015	CC17	Tiliaua rugosa	Bobtail
17/10/2015	C99	Tiliaua occipitalis	Western Blue Tongue
17/10/2015	CC20	Tiliaua rugosa	Bobtail
17/10/2015	GC20	Tiliaua rugosa	Bobtail
17/10/2015	GC5	Tiliqua rugosa	Bobtail
17/10/2015	DC20	Rattus fuscipes	Bush Rat



Date	Trap No	Species	Common Name
17/10/2015	DC16	Varanus rosenbergi	Rosenberg's Goanna
17/10/2015	DC9	Tiliqua occipitalis	Western Blue Tongue
17/10/2015	DC7	Tiliqua rugosa	Bobtail
17/10/2015	DC6	Tiliqua rugosa	Bobtail
17/10/2015	D5	Tiliqua rugosa	Bobtail
18/10/2015	C24	Tiliqua rugosa	Bobtail
18/10/2015	CC14	Tiliqua rugosa	Bobtail
18/10/2015	CC19	Tiliqua rugosa	Bobtail
18/10/2015	G48	Tiliqua rugosa	Bobtail
18/10/2015	G46	Tiliqua rugosa	Bobtail
18/10/2015	GC40	Tiliqua rugosa	Bobtail
18/10/2015	D4	Tiliqua rugosa	Bobtail
18/10/2015	D42	Tiliqua rugosa	Bobtail
18/10/2015	DC14	Tiliqua rugosa	Bobtail
18/10/2015	DC20	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	AC4	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	A47	Tiliqua rugosa	Bobtail
18/10/2015	AC14	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	FC10	Tiliqua occipitalis	Western Blue Tongue
18/10/2015	FC7	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	FC6	Tiliqua rugosa	Bobtail
18/10/2015	F23	Tiliqua rugosa	Bobtail
18/10/2015	FC4	Tiliqua rugosa	Bobtail
18/10/2015	FC1	Tiliqua rugosa	Bobtail
18/10/2015	CAT8	Tiliqua rugosa	Bobtail
18/10/2015	EC2	Tiliqua rugosa	Bobtail
18/10/2015	EC4	Tiliqua rugosa	Bobtail
18/10/2015	EC4	Tiliqua rugosa	Bobtail
18/10/2015	EC6	Tiliqua occipitalis	Western Blue Tongue
18/10/2015	EC7	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	EC14	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	E74	Tiliqua rugosa	Bobtail
18/10/2015	EC18	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	EC20	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	Q03	Tiliqua rugosa	Bobtail
18/10/2015	CAT7	Tiliqua rugosa	Bobtail
18/10/2015	CAT13	Tiliqua rugosa	Bobtail
18/10/2015	CAT16	Tiliqua rugosa	Bobtail
18/10/2015	CAT16	Tiliqua rugosa	Bobtail
18/10/2015	CAT18	Tiliqua rugosa	Bobtail
18/10/2015	CAT13	Varanus rosenbergi	Rosenberg's Goanna
18/10/2015	FC10	Tiliqua rugosa	Bobtail
19/10/2015	FC1	Tiliqua rugosa	Bobtail
19/10/2015	Q01	Tiliqua rugosa	Bobtail
19/10/2015	Q03	Tiliqua rugosa	Bobtail

