



Government of South Australia  
South Australian Arid Lands Natural  
Resources Management Board



July 2009  
South Australian Arid Lands Natural Resources Management Board  
Marsupial mole (*Notoryctes typhlops*) survey,  
Ingomar Station, SA  
Reece Pedler

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# INTRODUCTION

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Marsupial Moles are the only truly fossorial (burrowing) mammal in Australia and remain one of the least understood of Australian mammals. They uniquely tunnel through loosely cemented sand in arid dunefields, backfilling as they go (Benshemesh 2004). Very little is known about their life ecology including their social behaviour, reproductive biology or even their diet. Two species are currently recognised, including the Northern Marsupial Mole or Kakarrutal (*Notoryctes caurinus*) and the Southern Marsupial Mole or Itjaritjari (*Notoryctes typhlops*) (Van Dyck and Strahan 2008).

The known distribution of the Southern Marsupial Mole extends from southern Northern Territory and eastern Western Australia into the north and west of South Australia (Van Dyck and Strahan 2008). Within South Australia they are known from the northwest in the Anangu Pitjantjatjara Yankandjatjara Lands and as far east as the mid Simpson Desert, east of Purni bore (Watson 2007). In the south and east, records exist from the Yellabinna Regional Reserve and western edge of Lake Everard (Benshemesh 2004). Between the Simpson Desert in the north and Yellabinna area in the south, their distribution is not well understood, but may extend as far east as Oodnadatta (Benshemesh 2004).

The current survey was prompted by an anecdotal report of a Marsupial Mole on Ingomar Station by Bobby Brown, a senior Antikirinya/Yankandjatjara traditional owner. Bobby remembers catching and playing with at least one marsupial mole along with his brother Sammy when he was around 12 or 13 years of age (early/mid 1950's) in the sandy area just north of Ingomar Homestead. Bobby says he will never forget what a fast digger the creature was – when placed on the ground, it would disappear into the sand. However a lump on the surface showing something moving just below the sand gave away its position and the boys played tricks on the animal such as digging holes in front of its path, causing it to drop into an open hole. Bobby was hopeful that the moles were still present in the area and requested assistance to carry out surveys to find them again.

# METHODS

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Searching was carried out for Marsupial Moles using the trench survey technique (Benshemesh 2005). This method involves digging 100 cm long x 80 cm deep x 40 cm wide trenches on the slopes or crests of sand dunes. Within each trench, the north-facing wall was carefully smoothed by hand and then allowed to dry for between one and three days to allow signs of back-filled mole tunnels through the soil profile to become evident.

A total of 57 trenches were dug in dune crest and mid slope areas at fifteen sites in dunefield areas (3-5 trenches per site). The main survey effort was during 20 - 24<sup>th</sup> July 2009 (46 trenches at 13 sites), but some other opportunistic survey was also carried out previous to this during an initial visit in February 16<sup>th</sup> and 17<sup>th</sup> 2009 (11 trenches at 3 sites, Table 1).

Two large trenches that had been dug in sand dune country using a mechanical loader as part of mining exploration activities were also opportunistically examined for signs of marsupial moles. Each of these trenches was approximately 10 m long and 80 cm deep at the deepest point (average 50 cm), providing a total of four 10 m<sup>2</sup> faces on which signs of mole tunnel structure activity could be examined if present.



Predator scats were collected opportunistically when encountered (total 13 scats from 8 locations). These were examined by Graham Medlin of the SA Museum for fragments of bone and/or hair that could be used to determine the identity of dietary items. Hair found in the scats was identified by Rachel Paltridge of Desert Wildlife Services.

Weather during the time of the July survey was fine with temperatures above average, with mild overnight minimums (5.0 - 9.7 °C) and warm, sunny daytime conditions (Max temperatures 18.4 - 27.3 °C). Weather during the February trip was warm with max daily temperatures of 35 °C (recordings at Coober Pedy Airport, Bureau of Meteorology 2009).

**Table 1.** Summary of survey sites, physical features and search effort at each.

Site	Digging Date	Site Vegetation and physical features	Drying time (hrs)	Number trenches	Comments
ING001	20 <sup>th</sup> July 2009	<i>Acacia aneura</i> , <i>Senna petalostylis</i> , <i>Atriplex vesicaria</i> , <i>Sida sp</i> , <i>Salsola kali</i> Dune height: ~3 m, sand moist	52	4	Fox tracks observed
ING002	20 <sup>th</sup> July 2009	<i>Acacia aneura</i> , <i>Senna petalostylis</i> , <i>Eremophila sp.</i> , <i>Atriplex vesicaria</i> , <i>Sida sp</i> , <i>Salsola kali</i> Dune height: ~3 m, sand moist	53	5	Fox tracks observed
ING003	20 <sup>th</sup> July 2009	<i>Acacia aneura</i> , <i>Dodonia viscosa</i> , <i>Ptilotus polystachyus</i> , <i>Lycium australe</i> Dune height: ~3 m, sand moist	51	4	
ING005	20 <sup>th</sup> July 2009	<i>Acacia ramulosa</i> Dune height: ~3 m, sand moist	50	4	
ING006	20 <sup>th</sup> July 2009	<i>Acacia ramulosa</i> , <i>Ptilotus polystachyus</i> Dune height: ~3 m, sand moist Dune height: ~3 m, sand moist	50	6 (3 Feb 09, 3 July 09)	(site of original sighting – also visited in Feb 09)
ING007	20 <sup>th</sup> July 2009	<i>Acacia ramulosa</i> , <i>Dodonia viscosa</i> , <i>Eremophila sp.</i> , Edge of claypan Dune height: ~3 m, sand moist	48	4	Fox tracks observed
ING008	21 <sup>st</sup> July 2009	<i>Acacia ramulosa</i> , <i>Acacia ligulata</i> , <i>Senna petalostylis</i> Dune height ~5m, sand very dry	18	4	Fox tracks observed
ING009	21 <sup>st</sup> July 2009	<i>Acacia ramulosa</i> , <i>Acacia ligulata</i> , <i>Dodonia viscosa</i> Highest sand dune on ridge (elevation 165 m) Dune height ~5m, sand very dry	16	3	Fox tracks observed
ING010	21 <sup>st</sup> July 2009	<i>Acacia ramulosa</i> , <i>Acacia ligulata</i> Dune height ~5m, sand very dry	15	4	Fox tracks observed
ING011	22 <sup>nd</sup> July 2009	<i>Acacia ramulosa</i> , <i>Acacia ligulata</i> , <i>Senna petalostylis</i> , <i>Atriplex vesicaria</i> Dune height ~5m, sand very dry	24	4	Fox tracks observed
ING012	22 <sup>nd</sup> July 2009	<i>Acacia aneura</i> , <i>Acacia ligulata</i> , <i>Senna petalostylis</i> , <i>Acacia ramulosa</i> , Dune height: ~2 m, sand dry	20	3	Fox tracks observed
ING013	22 <sup>nd</sup> July 2009	<i>Acacia aneura</i> , <i>Senna petalostylis</i> , <i>Eremophila sp</i> Dune height: ~2 m, sand dry	22	3	
ING014	22 <sup>nd</sup> July 2009	<i>Acacia aneura</i> , <i>Dodonia viscosa</i> , <i>Lycium australe</i> Dune height: ~5 m (close to Arkeeta Dam)	20	3	Fox tracks observed
ING015	17 <sup>th</sup> Feb 2009	<i>Acacia aneura</i> open woodland on sand plain. Site on road north of Four Corners Bore.	24	2	
ING016	17 <sup>th</sup> Feb 2009	<i>Acacia ramulosa</i> and <i>Acacia aneura</i> open woodland, scattered understorey of <i>Dodonia viscosa</i> and <i>Hakea leucoptera</i> . On first dune south of Tea Tree Dam Claypan	18	4	Fox tracks observed







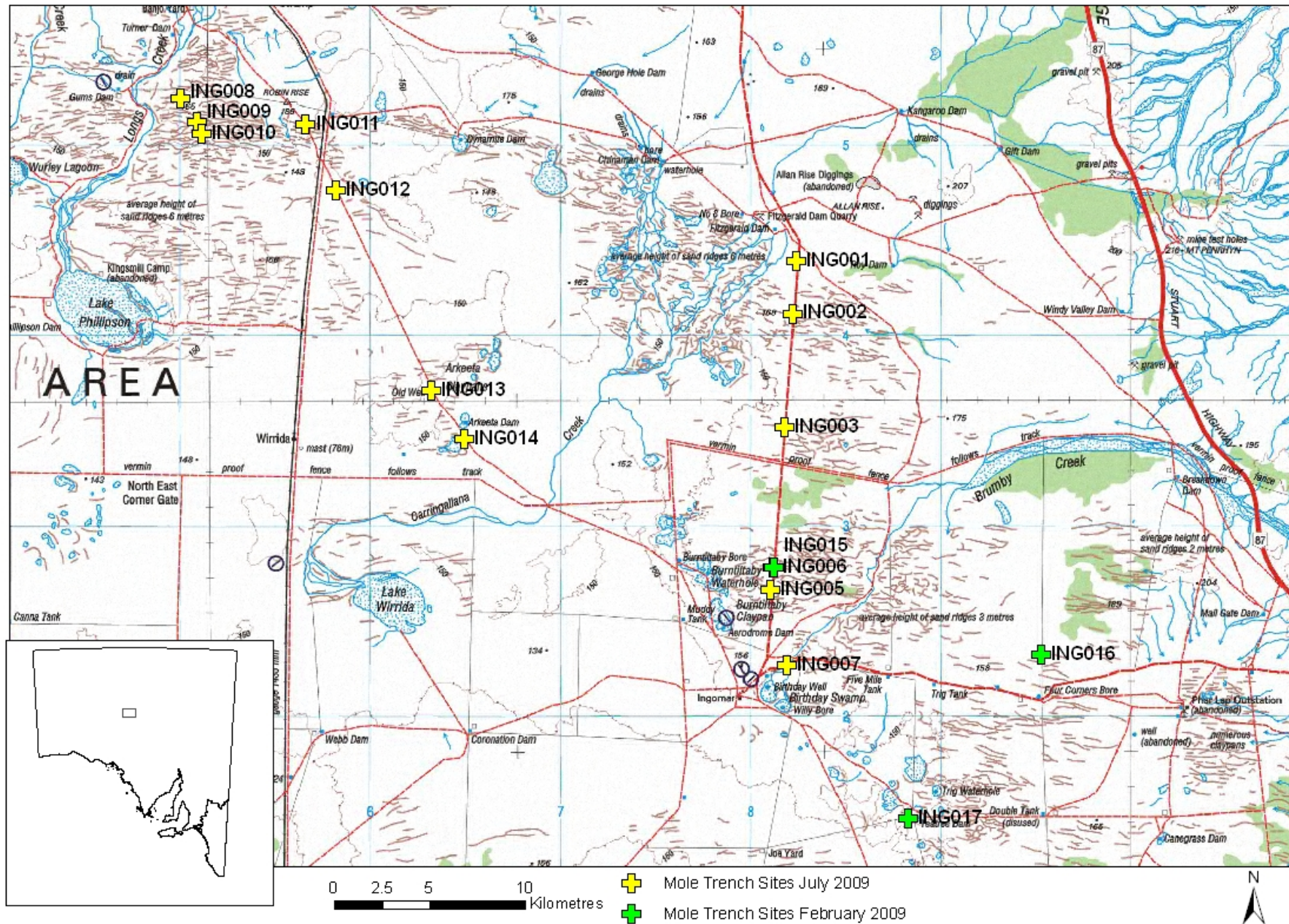
**Figure 1.** Lisa Taylor digging a mole survey trench at site ING003



**Figure 2.** Ralph Coulthard and Peter Birt digging a mole trench at site ING003, supervised by Bobby Brown.







**Figure 3.** Survey area on Ingomar Station, yellow crosses show the location of trench survey sites from the July 2009 survey, green crosses are preliminary sites from a previous trip in February 2009. The location of the area within South Australia is shown inset



## RESULTS AND DISCUSSION

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Only one of the fifty-seven trenches contained structures that could potentially have been produced by a Marsupial Mole (Figure 4 & 5). This trench contained two structures that were approximately 70 cm below the surface and were visible on the north-facing trench wall (the 'reading' side) as well as the south facing wall. The dimensions of the structures are on the larger side of those known to be produced by Marsupial Moles. The loose sand which was within the structures did not totally fill them and their shape was somewhat variable. For these reasons the holes are not typical of known mole tunnel structures, but could conceivably be produced by them. However, the fact that no other signs of moles were found in so many trenches suggests that these structures are unlikely to be of marsupial mole origin. Given the number of trenches dug and inspected, several dozen tunnel structures could be expected if moles were present in the area (J Benshemesh pers. comm. 2009).

During mole surveys in Tallaringa Conservation Park, approximately 140 km west-north-west of the sites at Ingomar, 20 mole tunnel structures were found from just 3 trenches (Benshemesh unpublished data). Other surveys in areas of low Marsupial Mole density on the eastern margin of their distribution in the Simpson Desert detected mole structures in 9 out of 75 trenches (Watson 2007).

Signs of foxes were prevalent and their tracks were recorded at 10 of the 13 sites visited during the July survey. Foxes and cats have been shown to be a potentially important predator of Marsupial Moles (Paltridge 1998, Benshemesh 2004).

Analysis of fox scats collected at the trench sites failed to detect any Mole remains, however a range of other species were detected, including hairs from rabbit, cat and small rodent.

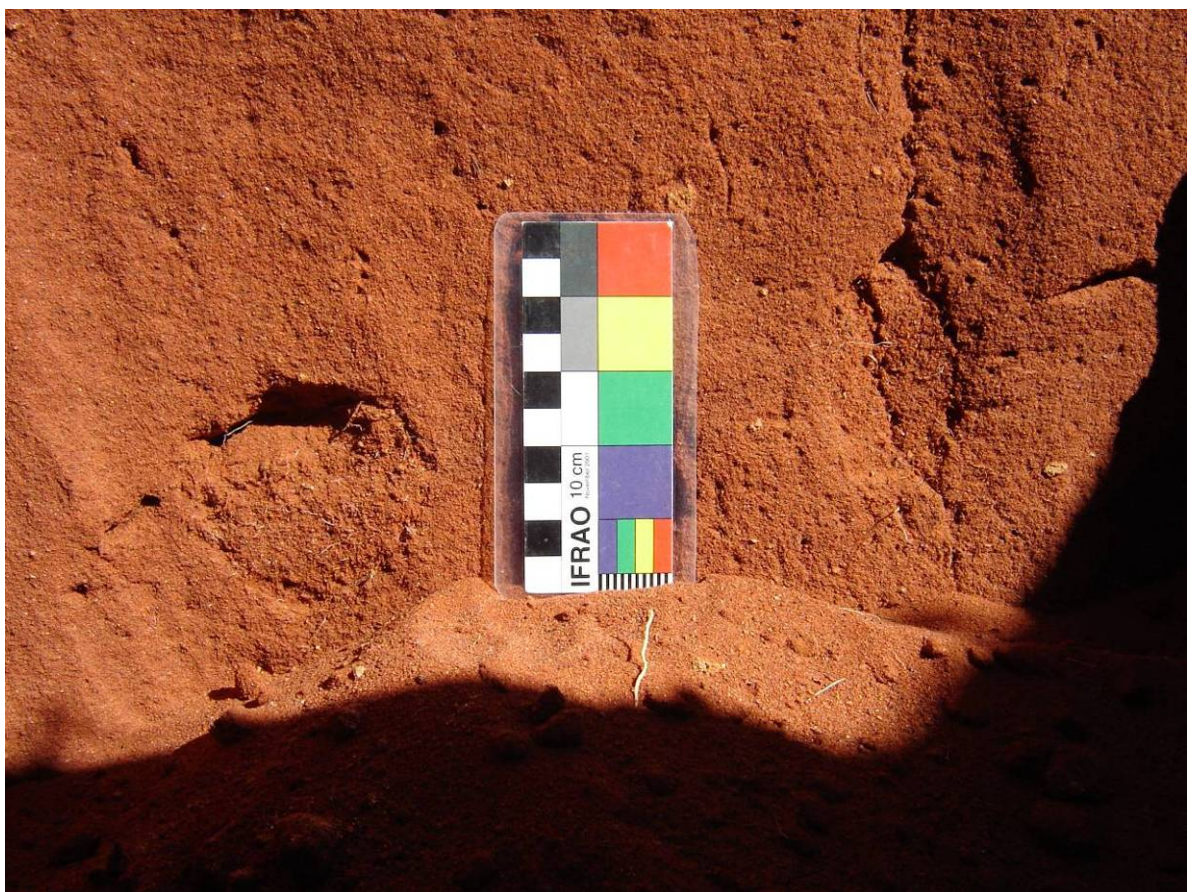
Despite Bobby Brown's observations of Marsupial Moles many years ago, it seems unlikely that the species is still present in the areas surveyed. The sand dune country on Ingomar Station is somewhat patchy and is not completely continuous with other dune field areas to the west. These fragmented dune areas on the eastern margin of Marsupial mole distribution may be vulnerable to changes brought about by European land use practices such as historically high numbers of sheep and cattle. Introduced predators such as foxes may also be responsible for significant predation pressure on this species.







**Figure 4.** A potential mole tunnel structure in a trench on a dune crest at site ING001.



**Figure 5.** The same structure (left of scale bar) at site ING001 after being 'rubbed back' slightly. The structure on the right side of the photo could also potentially be of Marsupial Mole origin.





## ACKNOWLEDGEMENTS

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Bobby Brown's eagerness in sharing his knowledge and stories about his traditional country on Ingomar Station is gratefully acknowledged. Survey participants learnt a great deal by having this amazing depth of knowledge and culture shared with them.

Ingomar Station managers Derry and Christine Maynard are thanked for allowing access for the purposes of these surveys.

Thankyou to Graham Medlin and Rachel Paltridge for their respective assistance in identifying the contents of predator scats.

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# APPENDICES

## Predator scat details

Scat samples from Ingomar Station, South Australia sent by Reece Pedler on August 3 and August 10, 2009 (All coordinates Map Zone 53.)

Sample Bag No.	Date of Collection	Easting	Northing	Museum Sample Code	Reece's Site Code	Description of Site	Other Comments	Material found
1.	21/07/2009	445431	6740203	ING 1	Not allocated	Long's Creek, near Lake Phillipson.	1 fox scat incl.	Cattle or camel hair
2.	22/07/2009	458208	6747651	ING 2	ING 012	Low dune near Trans Aust Railway, on track SE of Robin Rise.	1 fox scat	
3.	22/07/2009	458208	6747651	ING 3.1	ING 012	Low dune near Trans Aust Railway, on track SE of Robin Rise.	[4 fox scats (3.1, 3.2, 3.3a, 3.3b) (2 types)] incl.	Cat hair
	22/07/2009	458208	6747651	ING 3.2	ING 012	Low dune near Trans Aust Railway, on track SE of Robin Rise.	Incl.	Cat hair
	22/07/2009	458208	6747651	ING 3.3a	ING 012	Low dune near Trans Aust Railway, on track SE of Robin Rise.	Incl.	Rabbit hair
4.	22/07/2009	464939	6734617	ING 4.1	ING 014	Near Arkeeta Dam and claypans.	[4 scats (4.1, 4.2, 4.3a, 4.3b).] 4.1 probably includes plant fibre.	
	22/07/2009	464939	6734617	ING 4.2	ING 014	Near Arkeeta Dam and claypans.	Incl.	Rabbit hair
	22/07/2009	464939	6734617	ING 4.3a	ING 014	Near Arkeeta Dam and claypans.	Incl.	Rabbit hair and feather fragments





	22/07/200				ING				Feather fragments
	9	464939	6734617	ING 4.3b	014	Near Arkeeta Dam and claypans.	Incl.		
5.	22/07/200				Not allocated	Junction of Caringalla Creek and old vermin-proof fence (Prominent Hill Haul Road).	1 scat incl.		
	9	469393	6731085	ING 5					
6.	22/07/200				ING	Near Fitzgerald Dam on old Stuart Highway.	1 scat		
	9	482417	6743932	ING 6	001				
7.	22/07/200				ING	~ 2 km W of Trans Australia Railway on road SE of Robin Rise.	2 scats (7.1 & 7.2)		
	9	456639	6751100	ING 7.1	011				
	22/07/200				ING	~ 2 km W of Trans Australia Railway on road SE of Robin Rise.	Incl.		Rodent hair
	9	456639	6751100	ING 7.2	011				
8	21/07/200				ING	Mining exploration road in area of rolling sandhills with <i>Acacia ramulosa</i> on E side of Lake Phillipson	1 scat, incl.		Rabbit hair
	9	451163	6750606	ING 8	010				

Graham Medlin, Honorary Research Associate Subfossils, Mammal Section, Science Centre, SA Museum, North Terrace Adelaide, 5000.



## Opportunistic Records

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Birds (Observed 20<sup>th</sup>- 24<sup>th</sup> July 2009)

### Area around Ingomar Homestead and along old Coober Pedy/Tarcoola Road

Diamond Dove  
Crested Pigeon  
Red-capped Robin  
Crested Bellbird  
Grey Shrike thrush  
Chiming Wedgebill '*Tjitji Tjuta Bird*'  
Fairy Wren species  
Singing Honeyeater  
Crimson Chat  
White-fronted Honeyeater  
Southern Whiteface  
Thornbill Species  
Zebra Finch  
Australian Magpie

### Lake Phillipson Area

Pacific Heron  
Brown Falcon  
Bronzewing Pigeon  
Crested Pigeon  
Galah  
Little Corella  
Ringneck Parrot  
Mulga Parrot  
Bourke's Parrot  
Richards Pipit  
Ground Cuckoo-shrike  
Red-capped Robin  
Rufous Whistler  
Crested Bellbird  
Grey Shrike thrush  
Willie Wagtail  
Chiming Wedgebill '*Tjitji Tjuta Bird*'  
White-browed Babbler  
?Inland Thornbill  
Southern Whiteface  
Spiny-cheeked Honeyeater  
White-plumed Honeyeater  
White-fronted Honeyeater  
Singing Honeyeater  
Zebra Finch  
Australian Raven





## Reptiles

Ringed Brown Snake (*Pseudonaja modesta*) - Site 010 21/07/2009, 53J 451163, 6750606

Military Dragon (*Ctenophorus isoleps*) 'Tjimpi' - Site 010 22/07/2009, 53J 451163, 6750606

