



June 2008

Prepared for the SA Arid Lands NRM Board and the Friends of the Simpson Desert Parks

A Survey of Southern Marsupial Moles *Notoryctes typhlops* and Ampurta *Dasycercus cristicaudata* in the Simpson Desert, South Australia

1 Marsupial Mole (*Notoryctes typhlops*)

1.1 Introduction

The Southern Marsupial Mole (*Notoryctes typhlops*) is a secretive and poorly understood creature that inhabits the sandy deserts of central Australia. Both the Northern (*Notoryctes caurinus*) and Southern species (*N. typhlops*) are listed as *Endangered* under the *Environment Protection and Biodiversity Conservation Act 1999*. To date, only the Southern Marsupial Mole (*N. typhlops*) has been found in South Australia. It is listed as endangered under the *South Australian National Parks and Wildlife Act 1972 – Schedule 7 and 9*, amended September 2000. However, the cryptic nature and apparent rarity of this species makes direct examination almost impossible. Its exact status is therefore not well understood and very little is known of its basic ecology, distribution and abundance.

Indirect methods that can be used to assess the distribution of marsupial moles include searching for underground signs of mole activity and the collection and examination of predator scats (dingoes, foxes and cats). Underground signs can provide information about both the distribution and abundance of marsupial moles, while predator scats may contain marsupial mole remains and DNA and may therefore also provide information about which of the two species occurs in an area. Indirect detection methods for Marsupial Moles have been developed in the Anangu-Pitjantjatjara-Yankanjatjara Lands in South Australia (Benshemesh 2004). This method involves digging inspection trenches in sand dune habitat, where signs made by the moles digging through the sub-soil can be detected.

Prior to 2005, records of marsupial moles in South Australia had been restricted to the Anangu-Pitjantjatjara-Yankanjatjara Lands, the Maralinga Lands and Yellabinna Regional Reserve. In 2005, a preliminary survey was undertaken to look for *N. typhlops* in the Simpson Desert in northern South Australia and south-west Queensland (Benshemesh, 2005a). This survey revealed signs of marsupial moles at a number of sites in the Simpson Desert, but this sign was mainly restricted to the western half of the desert, gradually becoming less frequent and not found at all from approximately 160 km east of Purni Bore. There was no sign of marsupial moles found in Simpson Desert in Queensland. The 2005 survey was conducted at sites located 15 km apart and therefore provided quite coarse information about the distribution and abundance of marsupial moles in this region.

Follow-up surveys at a finer scale were carried out during 2006 and 2007 by the Friends of the Simpson Desert Parks in collaboration with Michelle Watson (SA Arid Lands NRM Board). This work detected signs of Marsupial Moles at a number of sites on the western side of the Simpson Desert. Survey sites were spaced at 5 km intervals, starting from the western side of the Simpson Desert Regional Reserve and working eastwards along the French Line and Rig Roads. The current survey continued on with this work, this time surveying along the French Line between the Erabeena and AAK tracks.

1.2 Methods

The current survey was undertaken between the 26th and 30th May 2008. A series of seven survey sites, were systematically located along the French Line, at 5 km intervals starting near the junction of the Erabeena and French Tracks. Trenches following the Marsupial Mole Survey Technique (Benshemesh 2005b) were installed by the Friends of the Simpson Desert Parks volunteers.

At each site a series of three trenches were dug approximately 150 m from the main vehicle track. Trenches were placed on the dune crest, at mid-slope and at the base of the dune.

The upper trench was located within 20 m of the dune crest, while the lowest trench was located where the slope became small or the vegetation changed. Mid-slope trenches were subsequently located one third to half-way between the crest and base trench. Trenches were located on the western side of the dune to maximize exposure to the sun. The precise location of each trench was primarily influenced by the vegetation at the site. Trenches were not located next to trees or shrubs, so as to avoid damaging the vegetation and to minimise the number of large roots encountered and damaged in the trenches. This arrangement of three trenches at each site was aimed at providing on what part of the sand dune marsupial moles are most likely to be found in.

Each trench was left for a minimum of 24 hours before being revisited to inspect for signs of moles and filled in.

1.3 Results and Discussion

No signs of Marsupial Moles were found at any of the seven sites (Figure 1 and Table 1). This result supports the trends of earlier FOS surveys in 2006 and 2007 and Benshemesh 2005. These surveys have detected a lower abundance of Marsupial Moles signs from west to east. Interestingly, mole signs were detected within a few kilometres of Site 45 from the current survey by the Benshemesh survey in 2005, as well as further to the east near Poeppel Corner. However, given the vast areas of sandy habitat in this area, it is highly likely that low densities of Marsupial Mole signs in the soil profile could be easily missed by the relatively small samples involved with the trench sampling method.

Generally, conditions seemed to be very dry during this survey, with many observers noting that the sand was much drier (and harder to dig in) than during previous surveys. Although the lack of signs discovered through this survey was disappointing at a personal level for those involved in the sampling, determining the extent of the distribution of the Marsupial Mole is an important step in increasing the knowledge of this species. In effect, carrying out the sampling technique and finding no signs of moles is just as important a result as finding them.

Given the lack of signs of marsupial moles detected, it is assumed that they are either absent from this area of the Simpson Desert, or at least in such low densities that they were not able to be detected. The reasons for this absence is not known, however it is speculated that average rainfall (which is likely to be slightly higher in the north-western site of the Simpson Desert) may play a role in this distribution. Other more complex factors such as abundance of prey items (such as ants), specific sand conditions as well as a host of other variables may also be important in determining Marsupial Mole distribution in the Simpson Desert. Unfortunately not enough is known about the detailed ecology of the species to determine which, if any of these factors may influence distribution. Investigating some of these relationships may be an important step in determining the status of the Southern Marsupial Mole.

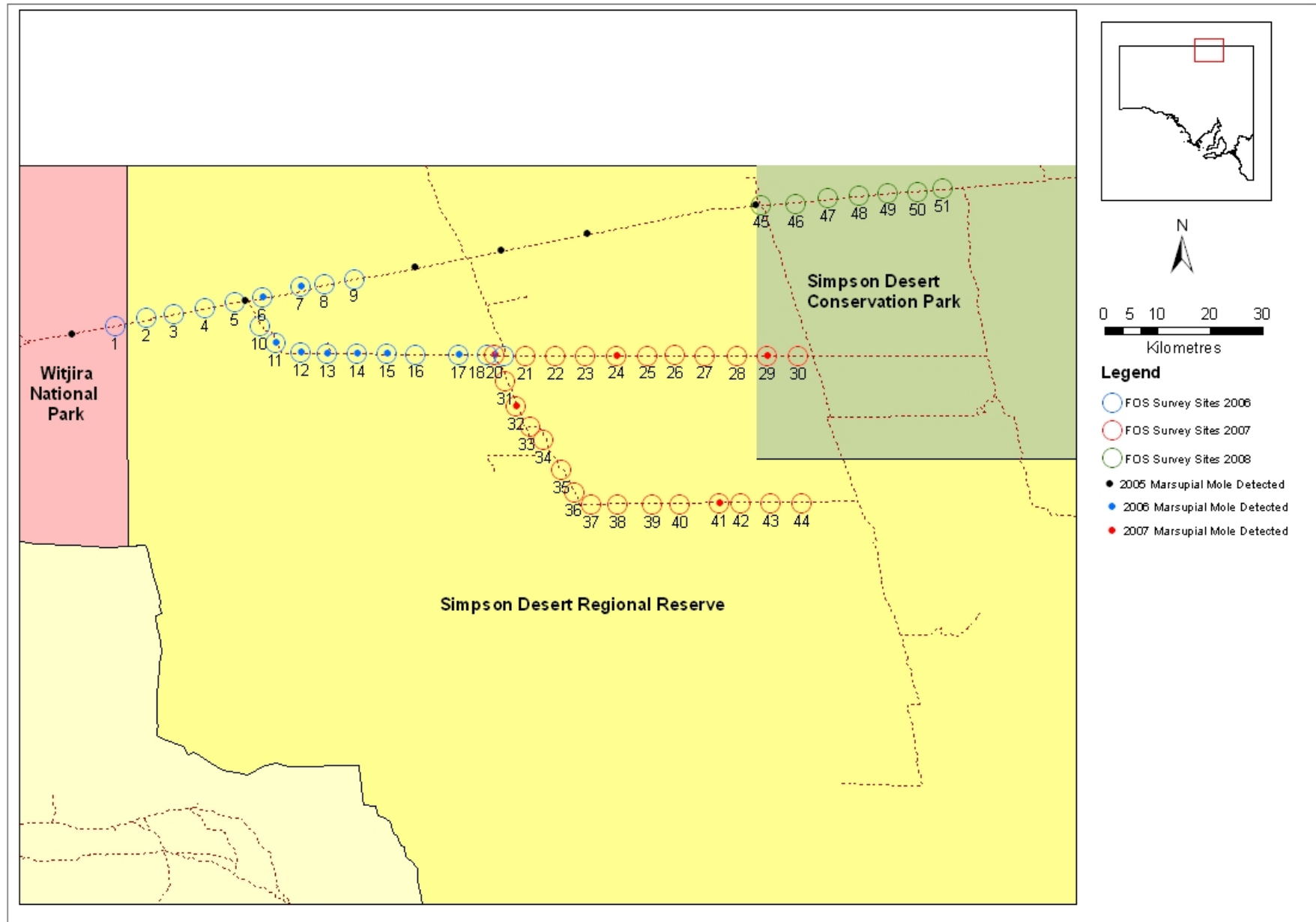


Figure 1.1. Simpson Desert National Parks area, showing results from previous and those surveyed during the current study.

Table 2.1. Results of Marsupial Mole Trench survey at seven sites along the French Line, Simpson Desert Conservation Park.

Site	Co-ordinates	Drying Time (hours)	Habitat/vegetation description	Signs found/ comments
1	53J 0726055, 7115060	63	Vegetation very sparse. Some <i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> .	No mole signs
2	53J 0731867, 7115081	24	Sparse vegetation, <i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> ., some ephemeral grasses (mostly dead).	No mole signs
3	53J 0737490, 7116062	24	<i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> .. Sand very dry. Some ephemeral grasses (mostly dead).	No mole signs
4	53J 0742701, 7116553	24	<i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> .. Sand very dry. Some ephemeral grasses (mostly dead).	No mole signs
5	53J 0747624, 7116936	24	<i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> .. Sand very dry. Some ephemeral grasses (mostly dead).	No mole signs
6	53J 0752862, 7117303	24	<i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> . Sand very dry. Some ephemeral grasses.	No mole signs. 1 Painted Dragon in trench.
7	53J 0757076, 7117626	24	<i>Acacia ligulata</i> (mainly dead), <i>Zygochloa paradoxa</i> .. Sand very dry. Some ephemeral grasses.	No mole signs

1.4 Recommendations

Friends of the Simpson Desert Parks may be able to continue to contribute information vital to understanding the ecology of the Southern Marsupial Mole though a number of areas of further work. These include:

- Continuing with the current fine-scale sampling technique (trenches at 5 km intervals) in areas of the desert that are as-yet un-surveyed.
- Collecting samples of ants at sites areas sampled and other strategic sites in the Simpson Desert to determine the food resources available to Marsupial Moles.
- Investigate the feasibility of installing simulated (replicated, artificial) mole holes as a way of determining the persistence of mole holes under local conditions.



Figure 1.3. A Marsupial Mole survey trench dug during the 2008 survey.



Figure 1.4. FOS members inspecting a trench for Marsupial Mole signs.



Figure 1.5. *Filling in a trench following inspection.*

1.5 References

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2 Ampurta (*Dasycercus cristicaudata*) trapping Survey

2.1 Introduction

The Ampurta (*Dasycercus cristicaudata*) is a small carnivorous mammal, which belongs to the *Dasyurid* Family of Marsupials (containing other better-known animals such as Quolls, Dunnarts and the Tasmanian Devil). This species was only recently recognised as separate from the Mulgara (Masters 1995) and was assigned the name *D. hilleri*. More recently the species was reclassified as *D. cristicaudata*, which confusingly, was the name previously assigned to the Mulgara (Woolley 2005). This current nomenclature is relatively controversial and may again change in the near future.

Regardless of changing names, two species distinct species are now recognised. The Mulgara, which is distinguished by a slightly bushier tail with no distinct crest, and a different number of nipples in females, is known to occur in northern parts of the Simpson Desert. This species is thought to favour the interdunal swales, or lower slopes of dunes, with clayey soil supporting Spinifex (*Triodia* sp.) (Ref). In comparison, the Ampurta is thought to mainly favour the crests and upper slopes of dunes supporting Canegrass (*Zygochloa* sp).

During previous FOS surveys, the tracks of either Ampurta or Mulgara were recorded at a number of locations (Watson 2006 and 2007). However, many of these habitats contained extensive areas of *Triodia basedowii* in the sandy interdunal areas as well as Dune Canegrass (*Zygochloa paradoxa*) along the upper dune slopes and crests. One individual was also captured in 2007 and identified as an Ampurta. The aim of the current survey was to confirm the identity of the animal making tracks and to describe the habitat attributes of the areas.

2.2 Methods

Five traplines were set at locations along the French Line and Rig Road in the vicinity of Wonga junction (Table 1). Sites were spaced approximately 5 km apart and were situated in areas where Ampurta tracks or burrows had previously been detected. At each site 2 boxes of Elliotts were set in lines running perpendicular to the track, resulting in 35 – 40 traps per site. Traps were set for three nights and checked early each morning. Traps were spaced approximately 20 m apart and were baited with a mixture of peanut paste, rolled oats, tuna oil and tinned fish.

Table 2.1. Summary of trapping sites, brief habitat description and trapping effort.

Site No.	Location description	Co-ordinates (WGS 84)	Habitat description	Trapping effort
REE 001	French Line, ~15 km W of Wonga Junction	53J 0624604, 7095364	Low, pale red dunes (height ~7- 8 m), sparsely vegetated. Main perennial vegetation included sparse <i>Acacia ramulosa</i> , <i>Triodia basedowii</i> , <i>Zygochloa paradoxa</i> . Little if any ephemeral or annual vegetation.	35 Elliots x 3 nights = 105 Trap nights
REE 002	French Line, ~15 km W of Wonga Junction	53J 0632904, 70977094	Low, pale red dunes (height ~7- 8 m), sparsely vegetated. Main perennial vegetation included sparse <i>Acacia ramulosa</i> , <i>Triodia basedowii</i> , <i>Zygochloa paradoxa</i> . Little if any ephemeral or annual vegetation.	35 Elliots x 3 nights = 105 Trap nights
REE 003	Wonga Junction	53J 0637880, 7097789	Low, pale red dunes (height ~7- 8 m), more thickly vegetated. Main perennial vegetation included <i>Acacia ligulata</i> , <i>Zygochloa paradoxa</i> , <i>Triodia basedowii</i> . Some cover of annual grasses from rain in recent weeks.	35 Elliots x 3 nights = 105 Trap nights
REE 004	Rig Road, ~ 5km S of Wonga Junction	53J 064 0165, 7093797	Pale red dunes (height ~9- 10 m), more thickly vegetated. Main perennial vegetation included <i>Acacia ramulosa</i> , <i>A. ligulata</i> , <i>Zygochloa paradoxa</i> , <i>Triodia basedowii</i> . Some cover of annual grasses from rain in recent weeks.	40 Elliots x 3 nights = 120 trap nights
REE 005	Rig Road, ~ 12 km S of Wonga Junction	53J 0644506, 7088217	Pale red dunes (height ~9- 10 m), more thickly vegetated. Main perennial vegetation included <i>Acacia ramulosa</i> , <i>A. ligulata</i> , <i>Zygochloa paradoxa</i> , <i>Triodia basedowii</i> . Some cover of annual grasses from rain in recent weeks.	40 Elliots x 3 nights = 120 trap nights
Total Trap Effort:				555 trap nights

2.3 Results and Discussion

Four Ampurtas were caught over the three nights of trapping, from sites REE001 and REE003. This included one female and three males. All animals captured exhibited the characteristic features of Ampurtas, namely the distinctive crested tail, relatively hair-free feet and the female had 8 nipples. In comparison, Mulgara lack the crested tail, have hairier feet and have only 6 nipples in their pouch (Adams *et al.* 2000, Woolley 2005).

Ampurtas were trapped in a variety of locations and vegetation types at only two of the five sites (Table 3). This included trap sites at both the crests and bases of dunes, in Spinifex (*Triodia basedowii*) and Dune Canegrass (*Zygochloa paradoxa*) associations.

Table 2.2. Summary of species captured and number for each site.

Site No.	Ampurta (<i>Dasyercus cristicaudata</i>)	Sandy Inland Mouse (<i>Pseudomys hermansbergensis</i>)
REE 001	2	0
REE 002	0	0
REE 003	2	6
REE 004	0	6
REE 005	0	3

Table 2.3. Details of Ampurtas captured and specific habitat at trap sites.

Site No.	Date	Sex	Weight	Position on Dune	Surrounding vegetation
REE001	3/6/08	M	133 g	Base – edge of small claypan	Under large Horse Mulga (<i>Acacia ramulosa</i>), some <i>Triodia</i> in vicinity
REE001	5/6/08	M	106 g	Mid-slope, western side	Very sparse vegetation, mainly dead <i>Acacia ligulata</i> , some <i>Zygochloa paradoxa</i>
REE003	3/6/08	F	75 g	Very top of crest	In among dense clumps of <i>Zygochloa paradoxa</i> .
REE003	5/6/08	M	Escaped before weighing	Mid-slope, western side	In among dense <i>Triodia basedowii</i> , with some <i>Acacia ligulata</i> (mainly dead).



Figure 2.1. Ampurta tracks in soft sand on the French Line. The animal has travelled from right to left in this photo (matchbox for scale).



Figure 2.2. An active Ampurta burrow at Wonga Junction. Two Ampurtas were caught within approximately 1 km of this burrow. Note the fresh tracks and scat near the entrance (matchbox for scale).



Figure 2.3. An adult male *Ampurta* captured at site REE 001 on the French Line, west of Wonga junction.



Figure 2.4. A second adult male *Ampurta* captured at site REE 001 on the French Line, west of Wonga junction, showing the crested tail and relatively hairless feet characteristic of the species.



Figure 2.5. A small female *Ampurta* captured at Wonga Junction (site REE 003).

2.4 References

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Acknowledgements

I would like to thank the Friends of the Simpson Desert Parks for their enthusiasm, energy and good company. I was impressed by their dedication and work ethic.

Special thanks to Alan Hancox for his support and to Marjorie Redgrave, Jan Forrest and Chris Wenham for their invaluable help with the Ampurta trapping. Thankyou also to the Department of Environment and Heritage staff including Roger Wilson, Tony Magor for assistance in the planning stages and Dean AhChee for sharing his knowledge and assistance in the field.

Appendix

Bird species observed along the French Line, Simpson Desert Regional Reserve and Conservation Park, unless specified otherwise (May 28th – June 5th 2008)

Emu (tracks only)
Wedge-tailed Eagle
Brown Falcon
Nankeen Kestrel
Bustard (tracks only – Site REE004, Rig Road)
Crested Pigeon
Budgerigar
White-backed Swallow
Red-capped Robin
Grey Shrike-thrush
Crested Bellbird
Rufous Whistler
Willie Wagtail
Chiming Wedgebill
White-browed Babbler (Rig Road)
White-winged Fairywren
Eyrean Grasswren (briefly seen running across Rig Road, west of Lynne's Junction)
Banded Whiteface (very abundant – seen/heard at almost every stop)
Singing Honeyeater
Spiny-cheeked Honeyeater
Orange Chat
Crimson Chat
Zebra Finch
Black-faced Woodswallow
Australian Raven