MAMMAL MONITORING

BARROW ISLAND NATURE RESERVE

OCTOBER-NOVEMBER 2006

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SUMMARY

Monitoring of abundance and condition of native mammals on Barrow Island was conducted during October-November 2006 at two trapping locations, near Wapet Landing and near the airport. In addition, we searched for introduced rodent tracks at three beaches.

No exotic mammals were trapped. No sign of the introduced Black Rat was found. Small mouse tracks were located near Wapet Landing. It is likely that these were made by juvenile native rodents, but the introduced House Mouse can not be ruled out on tracks alone and the area should be trapped to confirm this supposition.

Trap success rates for Elliott and Sheffield cage traps combined were: Landing 57.2%, Airport 68.8%, overall 63.0%. Trap success rates for pitfall traps were low: Landing 0.8%, Airport 2.5%, overall 1.6%. Very few small mammals were trapped: three *Planigale* sp., one *Pseudantechinus* sp. and one Barrow Island Mouse *Pseudomys nanus ferculinus*. No Rock-rats *Zyzomys argurus* were trapped.

1. INTRODUCTION

Barrow Island, as well as being of enormous nature conservation significance for other reasons, is one of Australia's most important mammal conservation areas. It supports 14 terrestrial mammal species (more than any other WA island), of which five are listed as threatened pursuant to the Western Australian *Wildlife Conservation Act 1950* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, while another is listed only under Western Australian legislation. The introduced House Mouse *Mus domesticus* and Black Rat *Rattus rattus* have been present on Barrow Island, but have been eradicated (Morris 2002). Barrow Island has been a producing oil field since 1964; until 1999 the operator was West Australian Petroleum Pty Ltd (WAPET); the operator now is Chevron Australia Pty Ltd.

The Interim Management Guidelines (IMG) for Barrow Island Nature Reserve (CALM 1999) provided that a formal mammal monitoring program be established. The former National Parks and Nature Conservation Authority, in reporting on a visit in September 1997, also recommended additional mammal monitoring. The IMG, Section 6.4: Management Actions states:

- "Establish protocols for terrestrial fauna monitoring on Barrow Island. These need to include:
    a) monitoring of mammal populations inside and outside the oilfield with a combination of spotlight transects and trapping;
    b) monitoring fauna recovery where rat eradication was undertaken (south end); and
    c) monitoring to ensure that feral animals, especially rodents and cats, do not establish.
- Establish protocols for determining the impact, if any, of road kills on mammal populations.
- Monitor the reintroduced population of Boodie *Bettongia lesueur* on Boodie Island.
- Continue monitoring the marine turtle rookeries on the west and east coasts of Barrow Island."

The mammal monitoring program was commenced in 1998 as a joint Department of Conservation and Land Management (CALM) (now Department of Environment and Conservation, DEC) and Chevron Australia project. It aims to address the first three of the above dot points. The full trapping program commenced in 2000. Marine turtle rookeries are being monitored under a separate program. Unpublished reports (Burbidge *et al.* 1998, 2000, 2003; Morris *et al.* 1999, 2001, 2002) provide the results of previous mammal monitoring surveys.

2. OBJECTIVES

The 2006 work program was aimed at trapping two grids, at the Landing and a new grid installed in June 2006 near the Airport, these being the most likely locations where introduced mammals might arrive on the island. At the same time, trapping allowed examination of abundance and condition of native mammals. We also searched beaches near the Landing, at John Wayne and at Bandicoot Bay for mammal tracks.

3. METHODS

3.1 Trapping

Five trapping grids, each covering one hectare, were established in November 1998 and completed in October 1999; however, all grids were not fully operational until 2000. A brief description of each is included in Burbidge *et al.* 1998. An additional grid, between the Airport and the east coast, was established in June 2006. The airport grid is located approximately 200 m east of the airport terminal building. Detailed flora surveys have been conducted in the area (Astron Environmental Services and RPS Bowman Bishaw Gorham, unpublished) and the airport grid traverses two recognised vegetation associations:

- C4g: Open heath (30-70%; 1-2m) of *Acacia bivenosa* over closed hummock grassland of tall *Triodia angusta*. There are scattered *Threlkeldia diffusa* and *Olearia dampieri* subsp. *dampieri* (ms).

- C1: Coastal complex dominated by *Spinifex longifolius* on white fore-dunes including coastal complex of *Ipomoea pes-caprae* subsp. *brasiliensis* and *Spinifex longifolius* on stand line foredunes.

In 2006, the 'Landing' and 'Airport' grids were trapped. Sheffield cage traps, medium Elliott traps and pitfall traps were set on both grids in a 5 x 5 pattern (20 m trap spacings) for five nights. The Landing grid was trapped on the nights of 26 to 30 November 2006 inclusive, while the Airport Grid was trapped on the nights of 28 November to 31 November inclusive.

All mammals trapped on grids were marked with a 'paint marker' pen on the right ear so that re-traps during the trip could be established. During previous trips, and during trapping conducted by Bamford and Bamford in 2004 for the Gorgon project, permanent implanted transponders (PITs) were implanted dorsally just under the skin between the shoulder blades of the larger mammals. A transponder reader was used to identify these animals.

Trap success rates for Spectacled Hare-wallabies *Lagorchestes conspicillatus conspicillatus*, Boodies *Bettongia lesueur* and Brushtail Possums *Trichosurus vulpecula arnhemensis* were calculated on cage trap numbers only; those for Golden Bandicoots *Isoodon auratus barrowensis* on cage and Elliott trap numbers; those for the *Pseudantechinus* sp., Barrow Island Mouse *Pseudomys nanus ferculinus* and Common Rock Rat *Zyzomys argurus* on Elliott and pit trap numbers; and those for *Planigale* sp. on pit trap numbers only.

Condition indices were calculated for each animal weighed and measured following Caughley *et al*. (1988), except that pes length rather than crus length was used and raised the calculation by an order of magnitude, ie, body weight in grams$^{1/3}$ / pes length in mm x 10.

Reptiles trapped and sighted on the grids were noted where they were identifiable to species level.

Past rainfall data and climatic data during the visit were obtained from the Bureau of Meteorology website.

4. RESULTS

4.1 Introduced mammals

No introduced mammals were trapped. It should be noted, however, that Black Rats (*Rattus rattus*) do not readily enter Elliott traps and only occasionally enter cage traps. Track searches on the beach northeast of Wapet Landing revealed no rat tracks, but small mouse tracks at the location shown in Figure 2 were located. These were most likely those of juveniles of the native Barrow Island Mouse or Common Rock-Rat, but House Mouse *Mus domesticus* can not be ruled out. Searches of beaches at John Wayne and Bandicoot Bay did not locate any rat or mouse tracks.

4.2 Native mammals

At both grids Spectacled Hare-wallabies, Boodies, Brushtail Possums, Golden Bandicoots and planigales were captured. At the Landing grid the Barrow Island Mouse was also trapped and at the Airport grid the *Pseudantechinus* sp. was trapped. No Rock Rats were trapped at either grid.

Capture rates are provided in Table 3. Overall trap success for cage and Elliott traps was 63.0% (Landing 57.2%, Airport 68.8%). Comparative trap success data for all years is shown in Figure 1.

4.3 Reptiles

Reptiles recorded on trapping grids and observed elsewhere are listed in Table 4. Two juvenile *Varanus acanthurus* were captured in pitfall traps at the Landing grid; one had a snout-vent length (SVL) of 94 mm. Mainland adults have SVL of up to 237 mm (Storr *et al*. 1983), although data on the size of Barrow Island individuals is not available.

3.4 Rainfall

Barrow Island received significantly above average rainfall in the two years preceding the visit. The average annual rainfall is 318 mm and the median rainfall is 285 mm. In 2005, 464.2 mm of rain fell, mostly between March and July. In 2006, 639 mm of rain fell up to the end of October, most occurring between February and May. Record keeping commenced in 1967; however, data are not available for all months since then. Only in 1973, when 747 mm of rain was recorded, did rainfall exceed that of 2005.

5. DISCUSSION

Trap success rates at the Landing grid were similar to those in past years, although brushtail possum capture rates were the highest recorded. No historical data exist for the Airport grid.

Eleven bandicoots, seven possums and three boodies captured at the Landing grid had transponders, inserted in 2003 or 2004. These data, hopefully augmented in future years, will allow information on growth and longevity to be collected. For example, a female subadult

bandicoot with a body weight of 180 g and a pes length of 39 mm that was marked in October 2003, was adult and had a body weight of 275 g and a pes length of 42 mm in October 2006.

6. OTHER MATTERS

6.1 Introduced eucalypts

Over the past few visits to Barrow Island, it has been has noticed (by AAB) that eucalypt mallees and trees were becoming more obvious in the drainage line west of the Base area. These specimens were examined during the recent visit to the island. There appeared to be two species. One appeared to be *E. xerothermica*, the indigenous mallee that occurs at a few places near the island's west coast, but not formerly at this site. The other appeared to be a river gum or coolabah; it was not in bud and had no fruits, so identification was not possible. The list of known introduced species on the island (RPS Bowman Bishaw Gorham and Mattiske Consulting, 2005) includes only a single eucalypt—*E. gomphocephala* (tuart). However, the trees near the Base had smooth, white bark unlike tuart, which has grey, rough bark.

While looking at the eucalypts, we were approached by Lionel Taylor, a worker on the island who informed us that the trees had been planted by Chevron staff. One had been transplanted from the former 'castle' (the administrative block damaged by Cyclone Olivier in 1996 and since demolished), while others had been propagated from seedlings derived from trees planted adjacent to buildings in the Base and then planted at this site. (While the non-local trees around the Chevron Camp have been removed, there are still non-local eucalypts planted at Base.)

Planting trees in undeveloped areas of the nature reserve is undesirable and not legal.

6.2 Derelict mammals

While on Barrow Island, we were advised by Les McClements (Chevron environmental technician) that derelict animals were occasionally sent to a DEC (CALM) registered wildlife carer on the mainland, under agreed arrangements. It was understood by members of the DEC Fauna Conservation Research Program that this practice was no longer occurring.

It is our recommendation that Chevron undertake consultations with the DEC regarding removal of derelict animals from Barrow Island. The reasons are that none of these animals may be returned to the island, because of the risk of introducing disease, and also because there is a risk that Barrow Island animals may hybridise with mainland conspecifics. A further risk is that breeding of Barrow Island animals in captivity will produce surplus animals that may then be passed to wildlife parks, etc. with increased possibility of hybridisation or escape.

7. RECOMMENDATIONS

7.1 The detection of small rodent tracks on the beach Adjacent to Wapet Landing should be followed up by Elliott trapping and the use of small cage traps owned by Chevron and located on the island The area where the tracks were seen is shown in Figure 2.

7.2 The issue of planted eucalypts adjacent to the Base be followed up by DEC and Chevron.

7.3 DEC not permit any derelict or other animals to be removed from Barrow Island, except for conservation reasons sanctioned by the Director-General.

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DATE	Thurs 26/10	Fri 27/10	Sat 28/10	Sun 29/10	Mon 30/10	Tues 31/10	Total
Landing Grid	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P		**125 C** **125 E** **125 P**
Airport Grid		25 C 25 E 19 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	**125 C** **125 E** **119 P**

Table 1. Summary of trapping effort at Barrow Island – October – November 2006.

C – Sheffield cage trap
E – medium Elliott trap
P – pitfall trap

	Landing			Airport		
	Total captured	Recaptures (from previous years)	Re-traps (within year)	Total captured	Recaptures (from previous years)	Re-traps (within year)
Planigale sp.	1	0	0	2	0	0
Pseudantechinus sp.	0	0	0	1	0	0
Golden Bandicoot	73	12	38	133	0	56
Brushtail Possum	53	7	25	23	0	11
Spectacled Hare-wallaby	3	0	0	2	0	0
Boodie	13	3	5	10	0	4
Barrow Island Mouse	1	0	0	0	0	0

Table 2. Summary of trapping results at Barrow Island – October - November 2006.

Mammal species	Landing Grid	Airport Grid
Planigale sp.	0.8%	1.7%
Pseudantechinus sp.	0%	0.4%
Golden Bandicoot	29.2%	53.2%
Brushtail Possum	42.4%	18.4%
Boodie	10.4%	11.2%
Spectacled Hare-wallaby	2.4%	1.6%
Barrow Island Mouse	0.4%	0%
Rock-rat	0%	0%

Table 3. Trap success rates for the Landing and Airport trapping grids, October – November 2006.

LANDING GRID	
captured	sighted
Varanus acanthurus	*Lialis burtonis*
Ctenotus grandis	*Ctenophorus caudicinctus*
Ctenotus saxatilis	
Pseudechis australis	
AIRPORT GRID	
captured	
Diplodactylus jeanae	
Lerista cf. *muelleri*	
Lerista bipes	
SEEN ELSEWHERE ON ISLAND	
Varanus giganteus	
Chelonia mydas	

Table 4. Reptiles recorded during October 2006 visit to Barrow Island.

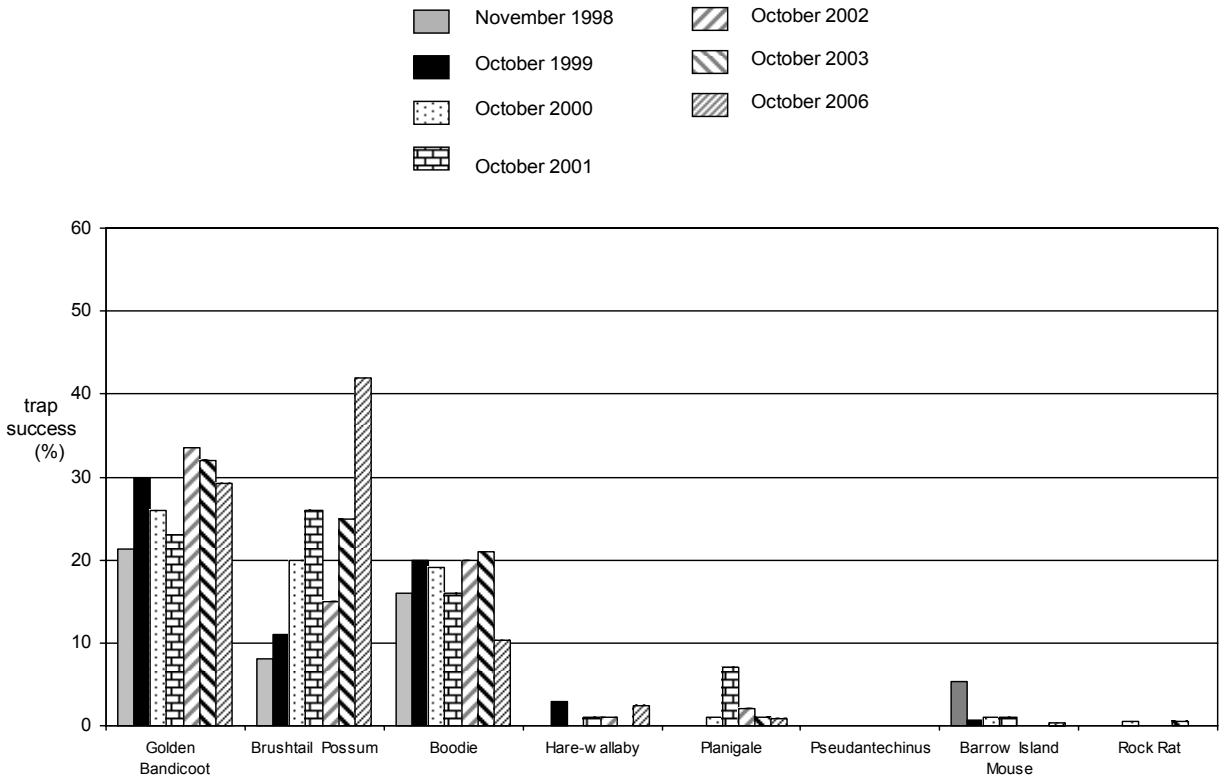

Figure 1. Mammal trap success rates on the Landing grid, Barrow Island, 1998 to 2006.

Figure 2. Area where small rodent tracks were observed on 29 October 2006 (denoted by red circle).