A report on the introduced Black Rat Rattus rattus on Barrow Island

by K.D. Morris September 1990

Introduction

Barrow Island is one of Australias most important nature reserves, being a refuge for several species of native mammal that have declined or become extinct on the mainland. Until recently it was thought to be the worlds largest land mass (233 km^2) with no introduced mammals. However on July 26, 1990, a male Black Rat *Rattus rattus* was trapped in sand dunes at the west end of Bandicoot Bay. Many of the islands around Barrow Island supported *Rattus* populations, these having been introduced in the late nineteenth century from careened pearling vessels which used the islands as bases. Following the discovery of oil at Barrow Island in the early 1960's several mammal surveys of the island were undertaken by W.H. Butler. No *Rattus* were trapped however the south end of the island was not surveyed. Three *Rattus* specimens have been previously taken from Barrow Island but these were all related to bird of prey kills from adjacent islands. In 1983 *Rattus* was discovered on Prince Island off the east coast of Barrow Is. As this island is connected to Barrow Is. at low tide it was feared that *Rattus* would have invaded Barrow Is. However an extensive trapping and search program along the adjacent coast and warehouses failed to detect *Rattus*. It was proposed that because Barrow Island had such an intact fauna, no introduced mammal could find a niche available to occupy. Between 1983-1985 Prince Island and most of the others supporting *Rattus* populations were baited and the rats eradicated. Middle Island was left unbaited because of the presence of Golden Bandicoots, and the existence of a 300 m wide deep channel separating Middle and Barrow Islands. It was thought that if *Rattus* could not establish from Prince Island, they would be unable to establish from Middle Island. Despite the recent discovery of *Rattus* on the south end of Barrow Island, this may in fact still be the case. Pearling camps also occurred on this part of Barrow Island and the rat could have been introduced in this way, rather than by invasion from Middle Island. The south end was searched visually for *Rattus* tracks in 1985 and between 1987-1989; none were found. This however cannot be regarded as evidence for their absence at this time because:

a) these searches were opportunistic and did not cover the entire area;
b) *Rattus* tracks are easily disguised by tracks of other mammals;
c) the *Rattus* are at low densities and tracks were only seen during this recent survey after the rats had been attracted to the baited traps.

Between 7-12 August 1990, an extensive trapping program was undertaken on the south end portion of Barrow Island. Its aims were to:

a) determine the extent and density of *Rattus* in this area;
b) determine which native mammal species were present.

Using this information, an eradication program was developed.

Methods

Eight trapping grids were established, each grid consisting of 10 x 5 medium elliott traps and covering 2 ha (20 m trap spacings). In addition, traps were placed on Pelican Island in Bandicoot Bay, and in mangroves on the north side of Bandicoot bay. Twelve pit traps and drift fences were also set as part of grid 8.

Grids 1,2,3,6 and 8 were set in deep white sand dune habitat sparsely vegetated with *Spinifex longifolius, Acacia coriacea* and *Triodia pungens*, with occasional *Myoporum* and *Atriplex* shrubs. This is the predominant vegetation type in the area.

Grid 4 was set in shallow brown soils between limestone outcrops. It was vegetated with *Olearia, Triodia,* and *Melaleuca.*

Grid 5 was set on a limestone outcrop vegetated by *Ficus, Acacia* and *Triodia.* Grid 7 was set across coastal *Spinifex longifolius* habitat and into deep brown soils supporting *Triodia angusta, Olearia* and *Acacia bivenosa.*

The mangrove and Pelican Island traplines ran though small *Avicennia marina* patches and adjacent halophytic species.

Traps were checked between 0630 and 1100 each morning. Any *Rattus* trapped were collected. *Isoodon auratus* were sexed, weighted, marked before release, while all other species were released. A sample of *Pseudomys nanus* were also weighed before release.

Spotlighting was undertaken around Bandicoot Bay and down the east side of the south end part of Barrow Island. The rubbish tips and incinerator were also inspected at night.

Results

Between 7-12 August, 1687 trapnights were achieved. Details of the number of trapnights on each grid is shown in Table 1. Seven *Rattus* (4 female; 3 male) were trapped; 4 at grid 1, 1 at grid 3, and 2 at grid 8. Both sub-adult and adult animals were present, but no breeding activity was evident. This is in addition to the one adult male *Rattus* trapped on July 26, from 98 trapnights. These results suggest a density of at least 2 *Rattus* per hectare. This is low compared to densities of *Rattus* on other islands such as Bedout and Boodie Islands where densities of up to 10 *Rattus* per hectare have been recorded. However the habitat in which *Rattus* were trapped

covers approximately 400 ha at the south end, indicating that perhaps 1000 *Rattus* are present.

All the native mammal species recorded for Barrow Island, except for the Euro, rock wallaby and bats were recorded in the study area. The Golden Bandicoot and Western Chestnut Mouse were recorded from all grids, while the Burrowing Bettong was recorded from all but the southern 2 grids (grids 1 and 2). Trapping results are shown in Table 2. In addition to those species trapped, the Water Rat and Spectacled Hare Wallaby were also sighted at night. Water rat tracks were also seen on Pelican Island. The Northern Brush-tailed Possum extended further south than the trapping results suggested. In the study area the Golden Bandicoot occurs at a density of at least 8/ha. This is similar to that found recently at John Wayne Country further north on the west coast of Barrow Island. Male Golden Bandicoots were trapped three times the frequency of females (97 males : 33 females). No mammals were trapped on Pelican Island.

Conclusions

The trapping results suggest that *Rattus* is distributed throughout the south end of Barrow Island, north to approximately the Eagle Nest track. This is predominantly a white sand dune habitat with some brown soils and more diverse vegetation occurring toward the northern part of this area. It is difficult to determine how long the *Rattus* have been on Barrow Island. I believe that they have been there for some time after having invaded from Middle Island or from a pearling camp on Barrow Island at the turn of the century. However this is difficult to prove because of the lack of trapping data from this area previously. I don't believe they are a recent introduction from the activities of WAPET on the island. There is no doubt that a baiting program is required to eradicate *Rattus* from Barrow and Middle Islands as soon as possible.

a) Proposed baiting program

The baiting program needs to have as its aim, the eradication of *Rattus*, while minimizing the effect on native species. This will be a major undertaking and will require the cooperation and assistance of WAPET, and staff and financial resources from CALM Pilbara Region, Environmental Protection Branch and Research.

It is proposed that Pindone impregnated oats be placed in an elevated position (on either upturned Rheem buckets, or Koppers logs) throughout the area to be baited, and on a 50 m grid. Planks of timber will be placed on these elevated positions to allow access to the baits by *Rattus*. Bait stations would be monitored closely to reduce the amount of spillage available to native species and to ensure that sufficient oats were available for the *Rattus*. Trapping during and after the baiting will be undertaken to determine; a) the effect of the baiting on *Rattus* and native species, and b) the rate of

recolonization of native species adversely affected by the baiting. It will also be necessary to trap Middle Island prior to baiting to determine the present density of Golden Bandicoots and *Rattus* on the island so that appropriate bait spacings can be determined.

b) Likely effects on native mammal species

Of the native mammal species present in the area to be baited, the baiting method outlined above should reduce the risk to all but the Northern Brush-tailed Possum and the Western Chestnut Mouse. The elevated bait stations should preclude the Boodie, Golden Bandicoot and Hare-Wallaby, which do not climb. The small dasyurids and Water rat will not take an oat bait. Spillage of poisoned oats may lead to some mortality among these species. Fortunately all species (except the small dasyurids) found in this area are relatively common on Barrow Island and if mortality was excessive, species could be actively reintroduced to the area following the successful eradication of *Rattus*. Baits would be removed following the successful baiting so that recolonizing native species would not be at risk.

c) Timing of baiting

Two options are available for this baiting program.

Option 1. This involves undertaking a trial baiting in the northern portion of the area to be baited, i.e. from Eagle Nest Track south to the Bandicoot Bay narrow neck. This would involve approximately 1200 bait stations. The advantage of undertaking this trial first is that the effectiveness of the baiting methods in killing *Rattus* could be tested before undertaking an all out baiting. The likely effects on native fauna could also be determined. This exercise would be logistically and financially easier to undertake (1200 bait stations vs 5000 bait stations see attached budget). It would allow proper planning and technique modification to be undertaken for the baiting of the rest of Barrow Is and Middle Island. The pre-baiting trapping of Middle Island could be undertaken simultaneously. By baiting the northern portion of the area and by maintaining baits at the narrow neck, an effective barrier to further northwards dispersal of *Rattus* could be established until the remainder of the area was baited (i.e. south of the narrow neck). This trial option would be undertaken in September/October 1990, with the remainder of the baiting being undertaken in May 1991.

Option 2: This involves the baiting of the entire area in the short-term (September/October). This would be a difficult objective to achieve. At least 10-12 persons would be required to establish the 5000 bait stations and WAPET would only be able to provide limited manpower support at this time. It would involve a budget of at least $30 000 (compared with $7000 in the short-term for

option 1) an amount that would be difficult to raise at short notice. The technique proposed is also unproven and may not be 100% effective. I believe the concern of *Rattus* spreading north can be addressed by using option 1 and monitoring a bait fence at the narrow neck of Bandicoot Bay.

Recommendations

1. That a *Rattus* baiting program be undertaken following option 1 above.

2. That this project, including the pre-baiting trials and surveys be given a high priority within CALM so that adequate staff and funds are available to support it. It will require input from CALM Pilbara region (who have responsibility for vermin control in their region), Environmental Protection Branch and Research Division.

3. That Leigh Whisson be seconded from his WWF project to assist in the planning and implementation of this project.

4. That WAPET be requested to support this project through assistance with travel, accommodation and logistic support on Barrow Island.

5. That this project be regarded as a sensitive issue with regard to the media and the possible killing of native fauna.

Rattus eradication - Barrow Island
Preliminary Budget

		Option 1 - Trial (1200 bait stations)	Option 2 Full bait (5000 bait stations)
1.	Pindan Oats	$ 2000	$10 800
2.	Koppers logs/or plastic 20 l buckets	$ 3700- $ 4700	$16 650- $19 500
3.	Salary for L. Whisson	$6 000	$ 6 000
3.	Vehicle running (CALM)	$750	$1 500
4.	Boat running	$250	$500
6.	Contingencies	$200	$500
	TOTAL	$11 900	$38 800
		6 persons for 2-3 weeks on Barrow Island	12 persons for 4-6 weeks on Barrow Island

Table 1

Number of trapnights Barrow Island
South End 7-12 August 1990

grid #	Date 8.8.90	9.8.90	10.8.90	11.8.90	12.8.90	TOTAL
1 (SE)	50	50	50	-	-	150
2 (SE)	50	50	50	50	-	200
3 (neck)	50	50	50	50	-	200
4 (ENT)	50	50	50	50	50	250
5 (ENN)	50	50	50	50	50	250
6 (ENS)	50	50	50	50	50	250
7 (AA)	50	50	50	50	50	250
8 (neck N)	-	-	-	40 elliotts	40 elliotts	80
Pelican Is.	-	10	10	10	-	30
Mangroves (BCB)	9	9	9	0	0	27
TOTAL	359	369	369	350 elliotts 12 pits	240 elliotts 12 pits	1687 24

Table 2

Mammal captures - Barrow Island
South end 7-12 August 1990

grid #	Species	8.8.90	9.8.90	10.8.90	11.8.90	12.8.90
1	Antechinus	1	1	0		
	Pseudomys	8	17	11		
	Isoodon	3	2	7		
	Rattus	2	2	0		
2	Antechinus	2	1	1	0	
	Pseudomys	1	1	4	5	
	Isoodon	4	3	1	1	
3	Pseudomys	11	15	9	2	
	Isoodon	12	3	6	4	
	Bettongia	0	2	1	0	
	Rattus	0	0	1	1	
4	Pseudomys	1	3	6	4	6
	Antechinus	1	-	-	-	-
	Isoodon	0	2	5	5	3
	Bettongia	0	0	0	2	0
5	Pseudomys	1	1	1	2	2
	Zyzomys	0	2	1	4	3
	Isoodon	0	0	3	2	1
	Bettongia	0	0	0	1	0
6	Pseudomys	3	4	1	5	6
	Isoodon	2	4	5	2	2
	Trichosurus	0	1	1	0	0
	Zyzomys	0	0	0	1	0
7	Pseudomys	2	5	4	1	5
	Zyzomys	1	1	3	3	1
	Isoodon	5	8	7	7	6
	Bettongia	0	0	0	0	1
8	Pseudomys		Not trapped		3	4
	Isoodon				13	11
	Boodie				1	1
	Planigale				1	1
	Rattus				1	1
Pelican Is		0	0	0		
Mangroves	Pseudomys	1	1	3		
	Isoodon	2	1	3		