DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

MAMMAL MONITORING, BARROW ISLAND NATURE RESERVE

OCTOBER 1999

Keith Morris[1], Andrew Burbidge[1], and Fran Stanley[2]

[1] CALM**Science** Division, Wildlife Research Centre, Woodvale
[2] CALM Pilbara Region, Karratha

1. INTRODUCTION

Barrow Island, as well as being of considerable nature conservation significance for other reasons, is one of Australia's most important mammal conservation areas. It supports 13 terrestrial mammal species, of which five are listed as threatened pursuant to the Wildlife Conservation Act (Table 1). (The Barrow Island Mouse, an endemic subspecies, qualifies as Vulnerable under IUCN Red List criteria, but is not currently listed.) Barrow Island has been a producing oil field since the mid-1960s, the operator being West Australian Petroleum Pty Ltd (WAPET).

The Interim Management Guidelines (CALM 1999) for Barrow Island Nature Reserve recommended that a formal mammal monitoring program be established. The NPNCA, in reporting on a visit in September 1997, also recommended additional mammal monitoring.

This report covers the second mammal monitoring visit undertaken between 11-20 October 1999. During this period we trapped on the five grids established in 1998 and continued the standard spotlighting transects run since 1973. Pit traps were established on the rocky S62, M21, and landing grids and operated for four, three and two nights respective. Time did not permit opportunistic trapping around the Base, Landing warehouses, or the narrow neck at Bandicoot Bay. In addition ear tissue samples were collected from Boodies, *Pseudantechinus* and *Planigale* for taxonomic work being undertaken by Dr Peter Spencer (Perth Zoo), Dr Mike Westerman) and Ms Nora Cooper (WA Museum) respectively.

Table 1. Terrestrial mammals of Barrow Island

Species	**conservation status**
Common Planigale, *Planigale* sp.	not threatened
Pilbara Pseudantechinus, *Pseudantechinus* sp.	not threatened
Barrow Island Golden Bandicoot, *Isoodon auratus barrowensis*	Vulnerable
Northern Brushtail Possum, *Trichosurus vulpecula arnhemensis*	not threatened
Barrow Island Boodie, *Bettongia lesueur* (Barrow Island subspecies)	Vulnerable
Barrow Island Spectacled Hare-wallaby, *Lagorchestes c. conspicillatus*	Vulnerable
Black-flanked Rock-wallaby, *Petrogale lateralis lateralis*	Vulnerable
Barrow Island Euro, *Macropus robustus isabellinus*	Vulnerable
Common Sheath-tail Bat, *Taphozous georgianus*	not threatened
Finlayson's Cave-bat, *Vespadelus finlaysoni*	not threatened
Rakali (Water-rat), *Hydromys chrysogaster*	not threatened
Djoori (Common Rock-rat), *Zyzomys argurus*	not threatened
Barrow Island Mouse, *Pseudomys nanus ferculinus*	not threatened (but VU using IUCN criteria)

2. OBJECTIVES

The objectives for this visit were:

1. Complete the establishment of pit traps on all the trapping grids.

2. Monitor abundance and condition of native mammals (apart from bats). Euros, Spectacled Hare-wallabies, Brushtail Possums and Boodies were monitored via spotlight runs, while Boodies, Golden Bandicoots, Brushtail Possums, native rodents and small dasyurid marsupials were monitored via trapping. Rock-wallaby abundance was assessed through scat accumulations at Q21.

3. Collect tissue for taxonomic assessment of the Boodie, *Planigale* and *Pseudantechinus*

METHODS

3.1 Trapping

Five trapping grids were established in November 1998 and a brief description is included in the report of that trip (Burbidge *et al.* 1998). It is proposed that a corner point of each grid be located accurately with differential GPS for long term future reference and locating on WAPET operational maps, so that disturbance in the future is avoided.

Cage traps and Elliott traps were run on all grids for four nights. Pit traps were run on John Wayne, Bandicoot Bay and S62 for four nights, on M21 for three nights, and on Landing for two nights. A summary of the trapping effort is shown in Table 2.

No opportunistic trapping was undertaken during this visit.

Table 2. Summary of trapping effort

DATE	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	Total
M21					25 C 25 E	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	**100 C** **100 E** **75 P**
Landing					25 C 25 E	25 C 25 E	25 C 25 E 19 P	25 C 25 E 19 P	**100 C** **100 E** **38 P**
John Wayne	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P				-	**100 C** **100 E** **100 P**
Bandicoot Bay	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P					**100 C** **100 E** **100 P**
S62					25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	25 C 25 E 25 P	**100 C** **100 E** **100 P**

Total Effort:	Cage traps	500
(# trap-nights)	Medium Elliotts	500
	Pits	413
		1 413

Trap success rates for Boodies and Brushtail Possums were calculated on cage trap numbers only, those for Golden Bandicoots on cage and Elliott trap numbers, those for the Pilbara Pseudantechinus, Barrow Island Mouse and Common Rock Rat on Elliott and pit trap numbers, and those for the Common Planigale on pit trap numbers only.

3.2 Tissue collection for taxonomy

Ear tissue samples were collected from Boodies, *Planigale* and *Pseudantechinus* for DNA and taxonomic assessment by Dr Peter Spencer (Perth Zoo), Dr Mike Westerman (LaTrobe University) and Ms Nora Cooper (WA Museum) respectively.

3.3 Other island visits

None of the islands around Barrow Island were inspected during this visit.

3.4 Spotlighting

The standard spotlighting transects (one in the largely undisturbed northern end of the island and one within the oilfield towards the southern end of the island) were run on four nights (12/10, 14/10, 15/10 and 18/10). The northern transect on the 18/10 was shortened because of a blown spotlight globe. Each transect is about 30 km long. A 4WD tray-top vehicle is driven at ca 15 km/h with one spotlighter observing animals. Distance from the centre-line of the transect was recorded to enable density calculations. To eliminate observer bias, each spotlighting team records on both runs on consecutive nights and the data from the two nights is combined.

4. RESULTS

Eight species of native mammal were trapped on the grids and six species identified during spotlight transects. No introduced species were recorded.

4.1 Grid trapping

The mean trap success rates for mammals trapped on the five grids in 1998 and 1999 is shown in Table 3. Trap success rates for each of the grids is shown in Figures 1 – 5, and species trap success rates are shown in Figures 6 – 12. A summary of the trapping results showing individuals trapped is shown in Appendix 1.

The Bandicoot Bay grid (coastal sand dune) was the most diverse with eight species of mammal trapped. Six species were trapped at S62 (rocky scree slope), five at the Landing grid (dense *Triodia angusta*), four at M21 (sparse *Triodia*) and three at John Wayne (*Triodia* and coastal dune). From previous trapping however it is known that another four species also occur at John Wayne. It is likely that the high number of Golden Bandicoots and Possums on this grid and the disturbance of Elliott traps is a factor in the low trap rates for the Barrow Island Mouse and Rock Rat.

Table 3. The mean trap success rates (± SE) for mammals on grids - Barrow Island 1998 and 1999.

	1998	1999
Golden Bandicoot	25.9 ± 4.6 %	34.7 ± 5.4 %
Brushtail Possum	6.3 ± 1.9 %	15.4 ± 7.0 %
Boodie	5.1 ± 2.9 %	9.2 ± 3.5 %
Planigale	0.4 ± 0.1 %	1.2 ± 0.1 %
Pilbara Pseudantechinus	0	1.0 ± 0.2 %
Barrow Island Mouse	1.9 ± 0.7 %	1.6 + 0.4 %
Rock Rat	0.1 ± 0.1 %	0.1 ± 0.1 %

4.2.1 Golden Bandicoot *Isoodon auratus barrowensis* (Figure 6).

The Golden Bandicoot was the most common species trapped and there was an increase in trap success in 1999 compared to 1998. Golden Bandicoots are the most abundant mammal on Barrow Island and are found in all habitats – they are trapped consistently on all grids. An average of 33 individuals was caught on each grid. When the collecting area of the grid is allowed for, it is estimated that there are approximately 3.7 bandicoots per hectare, or a total of 84 000 bandicoots on Barrow Island. No females were carrying pouch young, although some had elongated teats and had recently weaned young.

4.2.2 Brushtail Possum *Trichosurus vulpecula arnhemensis* (Figure 7).

Higher numbers of Brushtail Possums were trapped in 1999 on all grids except M21. While this species is also found in all habitats on Barrow Island, the higher numbers trapped at John Wayne and S62 reflect this species preference for habitat that includes rocky cliffs where they shelter during the day. Approximately 40% of the females were carrying pouch young and several others had nearly dependent young clinging to their backs.

4.2.3 Boodie *Bettongia lesueur* (Figure 8).

Boodies were trapped on all grids except John Wayne, where they had been trapped in low numbers in 1998. The highest trap successes for both 1998 and 1999 were achieved at the Landing and probably reflect this grid's proximity to a nearby warren. All females trapped had pouch young of various ages.

Barrow Island Boodies are significantly smaller than those on Bernier and Dorre Island and it has been suggested that they may be different taxa (Ken Aplin pers comm, Pope and King 1997 unpublished). DNA extracted from the ear tissue samples collected from barrow Island will be compared with samples form Bernier and Dorre Islands to clarify the taxonomy.

4.2.4 Barrow Island Planigale *Planigale* sp. (Figure 9).

Planigales were trapped at Bandicoot Bay (5 individuals) and S62 (1 individual) indicating the wide habitat preferences for this species on Barrow Island (coastal sand dune to rocky scree slope). Preliminary assessment of the tissue samples from Barrow Island suggest that the Barrow Island *Planigale* is different from *Planigale maculata*, and represents a third species of *Planigale* from the Pilbara region (Mike Westerman's email of 26 November 1999). Measurements of the individuals trapped are shown in Table 4 below. All females trapped were carrying unfurred pouch young.

Table 4. Measurements of *Planigale* trapped on Barrow Island in 1999.

Sex	Body weight (g)	Head length (mm)	Pes length (mm)	# pouch young	Comments
Female	9.0	22.3	9.8	> 2	trapped at Bandicoot Bay
Female	14.0	23.2	9.4	5	trapped at Bandicoot Bay
Female	9.5	23.1	9.1	> 2	trapped at Bandicoot Bay
Male	12.0	21.1	8.8		trapped at Bandicoot Bay
Male	10.0	24.1	9.4		trapped at Bandicoot Bay-died and sent to WA Museum
Female	12.0	21.8	7.8	1	trapped at S62

4.2.5 Pilbara Pseudantechinus *Pseudantechinus sp.* (Figure 10).

Three *Pseudantechinus* were trapped at Bandicoot Bay and another at S62. Nora Cooper (WA Museum) has proposed that this taxon is different from the mainland *Pseudantechinus macdonellensis*. DNA analysis of the ear tissue sent to the WA Museum has not been completed. Specimens are also required for morphometric analysis and these will be collected in 2000. All the individuals trapped were female, each with 6 unfurred pouch young. Measurements are shown below in Table 5.

Table 5. Measurements of *Pseudantechinus* trapped on Barrow Island in 1999.

Sex	Body weight (g)	Head length (mm)	Pes length (mm)	# pouch young	Comments
female	29.0	34.0	14.7	6 (10.0 mm CR)	trapped at Bandicoot Bay
female	-	34.3	15.7	6 (13.4 mm CR)	trapped at Bandicoot Bay
female	24.0	30.9	14.6	6 (8.5 mm CR)	trapped at Bandicoot Bay
female	27.5	34.5	13.5	6	trapped at S62

4.2.6 Barrow Island Mouse *Pseudomys nanus ferculinus* (Figure 11).

The Barrow Island Mouse was trapped in low numbers on all grids except M21. The highest trap success rate was 5.5% at Bandicoot Bay (10 individuals). This species is more abundant than indicated by these trap success rates and disturbance of Elliott traps by bandicoots and possums probably reduces their capture rate. Numbers trapped at the Landing were considerably less in 1999 compared with 1998 and the reason for this is unknown. This species was trapped for the first time at S62.

4.2.7 Common Rock Rat *Zyzomys argurus* (Figure 12).

This species is not common on Barrow Island and has been trapped during this program only at John Wayne in 1998 and Bandicoot Bay in 1999. Only one individual has been trapped at each location. It was anticipated that this species would be trapped in the rocky S62 andM21 grids, but this was not the case.

4.3 Spotlighting

Gross spotlighting data are presented in Table 6. Problems with unavailability of vehicles led to one night's spotlighting being cancelled. A spotlight failure on 18 October resulted in one traverse being incomplete. Therefore, only two nights of spotlighting data are strictly comparable (Table 4). On these nights, less animals were sighted within the oilfield (south run) compared to the north run, which is mostly in undisturbed areas.

Once sufficient data are available, spotlighting data will be analysed using the line transect method to produce density estimates.

Table 6. Number of each species sighted during spotlighting transects in October 1999

DATE	Transect	Golden Bandicoot	Possum	Boodie	Hare-wallaby	Rock-wallaby	Euro	Rodent/ Dasyurid	TOTAL
12/10/99	N	11	20	6	17	0	4	4	62
12/10/99	S	19	11	9	35	0	2	2	78
14/10/99	N	28	8	6	16	0	4	3	65
14/10/99	S	12	4	1	11	0	2	2	32
15/10/99	N	15	12	10	13	1	4	2	57
15/10/99	S	15	2	4	14	2	2	0	37
18/10/99*	N	2	6	8	1	2	2	0	21
18/10/99	S	10	4	6	14	0	6	2	42

* Incomplete transect; only 10 km traversed due to spotlight failure.

The spotlight failure on October 18 was costly as it prevented the completion of the spotlight traverses complementary to those on October 15. This means only one complete set of data can be used (Table 7).

Table 7. Combined numbers for the two transects, 12 and 14 October 1999

Transect	Golden Bandicoot	Brushtail Possum	Boodie	Hare-wallaby	Euro	Rodents/ Dasyurids	Total
North 12/14 Oct	39	28	12	33	8	7	127
South 12/14 Oct	31	15	10	46	4	4	110

Rock-wallaby numbers are not reported in Table 7 as they are sighted only on the north transect; no suitable habitat is traversed on the south transect. Between transect total numbers are not significantly different.

Table 8. Comparable spotlighting data for November 1998.

Transect	Golden Bandicoot	Brushtail Possum	Boodie	Hare-wallaby	Euro	Rodents/ Dasyurids	Total
3-4 Nov N	14	13	8	61	15	2	113
3-4 Nov S	20	10	14	45	3	5	97
5-6 Nov N	34	17	7	47	9	9	123
5-6 Nov S	35	19	6	54	3	12	129
9-10 Nov N	52	16	22	54	8	1	153
9-10 Nov S	61	14	15	57	1	5	153

Table 8 shows the variability between total number of animals sighted and between numbers of animals of each species sighted from night to night within a trip. Comparison between spotlighting data from 1999 with those of 1998 is difficult because of the low number of completed spotlighting traverses in 1999. Nevertheless, the 1999 spotlighting data do not give rise to concern about the numbers of any species, nor do they suggest a significant difference between the north and south traverses. Further analysis of the data, using distance from the centreline of the traverse, will be carried out.

4.4 Opportunistic observations

Rock-wallaby (*Petrogale lateralis lateralis*) scats were collected from the colony near Q21 for David Pearson's study on estimating rock-wallaby abundance from scat accumulations. Five rock-wallabies and four euros were seen sheltering in the cliff.

5. FUTURE WORK

As stated last year, we believe that the grid trapping and spotlighting design described above is the most cost-effective compromise for monitoring Barrow Island terrestrial mammals. The spotlighting has the added advantage of being comparable with data collected every two to three years since 1973. Last year we recommended that mammal monitoring, utilising the trapping grids and spotlight runs, should be undertaken each year for five years by CALM and WAPET staff and the frequency of work reviewed at the end of that period. The next visit is recommended for September/October 2000.

There were several problems this year that prevented us completing full data collection. Firstly, drilling and blasting holes for the pit traps took longer than expected. The explosives did not arrive on the island until after our arrival and the boxes containing the detonator cord and fuse were flooded during the trip from the mainland, necessitating further time delays while they were dried. Blasting the pits at the WAPET Landing site proved very difficult, due to the sponge-like nature of the rock. However all but six pits were installed and WAPET Field Services have undertaken to re-drill and blast these before our next visit. It will probably also be necessary to repack some of the pits installed at S62, M21 and the Landing as rain over the next 12 months will erode away the surrounding soil and rocks. An amount of topsoil will be left by Field Services at each of these grids just prior to the next trip. Some of the drift fences will also have to be replaced.

This program was intended to be a joint CALM/WAPET endeavour. However It has become clear that, unless there can be some guarantee of the availability of WAPET staff to assist in the project as required, CALM will have to provide all staff, except for two extra persons on each of the spotlighting nights. It is essential that four people are available to check traps each morning (two teams of two) and this needs to be completed by 1000 hrs to avoid the animals succumbing to heat stress. We also require a guarantee that two 4WD tray-top vehicles will be available on each of the nights that spotlighting is programmed.

One spotlighting evening had to be cancelled, as the vehicles required had been taken for another purpose. The added problem of a globe blowing in one of the WAPET spotlights significantly reduced the data collection. CALM will take back-up spotlights to Barrow in future to prevent the re-occurrence of this problem.

None of the other islands surrounding Barrow Island were visited during this trip. Double Island has not been visited by CALM staff since 1988 and should be during the visit in 2000. This will require either boat or helicopter assistance from WAPET.

Scats from the rock-wallaby colony at Q21 will again be collected in 2000, and live specimens of *Pseudantechinus* will be collected for the WA Museum.

6. OTHER ISSUES

6.1 Hygiene and detection of incursions of feral mammals

This issue was extensively discussed in last year's report. In that report, we recommended that the use of Talon wax baits in containers be investigated by WAPET. It was disappointing to note that there had been no progress on this recommendation. It is understood that representatives of CALM, WAPET and Toll Energy will be meeting in Dampier early in 2000 to discuss this further.

6.2 Euro deaths

Last year we were advised that there was concern at the number of Barrow Island Euros being killed by Lufkin pumps. These pumps are electrically driven and pump intermittently on a timed basis. Euros take shelter in the shade afforded by the pump and are sometimes killed by the rotating counter-weight when the pump starts up after a period of silence. Since our last visit WAPET have been trialling hard plastic mats with cones facing upwards (pyramid mats). These seem to prevent Euros from lying down, however the presence of Euro scats on the mats suggests that they will still stand on the mat in the shade of the Lufkin pump. It is recommended that these mats be placed on all Lufkin pumps that are assessed as providing shade for Euros.

6.3 Environment Centre

While WAPET have received justifiable recognition for their environmental management of Barrow Island, it was disappointing to see the condition of the environment centre on our arrival. Copious amounts of litter had been left inside and out, open containers were potentially acting as pit traps, and some unused antibiotics had been left in the laboratory. The rollerdoor on the store is difficult to open and close and is left open for long periods of time resulting in accumulations of dirt and litter, and access by animals. This needs to be repaired or replaced. The laboratory, store shed and surrounds were cleaned up by us before our departure in both 1998 and 1999. In 1998 we found a possum that had trapped itself in a cage trap and would have perished if we had not arrived. This area should set the example for the rest of the island and we would recommend that some effort is made by WAPET to maintain this area.

ACKNOWLEDGMENTS

WAPET arranged our visit and paid all travel, vehicle and accommodation costs. We received assistance from many WAPET and contract staff. We would like to thank Stephan Fritz for arranging the visit and helping us during the first few days and Luke Ulstrup who assisted with the blasting, pit trap establishment, trapping and spotlighting programs. Troy Crawford's assistance in drilling the Landing grid was greatly appreciated. We thank Phillip Genoni (AOC) for undertaking prompt repairs to the rock drill. We also thank those who filled the positions of vehicle drivers and data recorders during spotlighting transects: Tony Spencer, Mark Campbell, Alan Latto, Rob Bennett and Phillip Genoni. Sheryl Jones assisted with trap checking and lifting on the final day. Phil Fuller and Nicky Marlow (CALMScience) assisted with blasting pit traps and trapping respectively.

REFERENCES

Burbidge, A.A., Morris, K.D., and Boggs, W. (1998). Mammal monitoring Barrow Island Nature Reserve, November 1998. Unpublished Report, Department of Conservation and Land Management.

CALM (1999). Barrow Island Nature Reserve Interim Management Guidelines. Department of Conservation and Land Management.

Pope, L., and King, J. (1997). Genetic diversity in the burrowing bettong *Bettongia lesueur*. Unpublished draft manuscript.

Figures 1 – 12

Appendix 1

Figure 1. Mammal trap success rates on the Bandicoot Bay grid

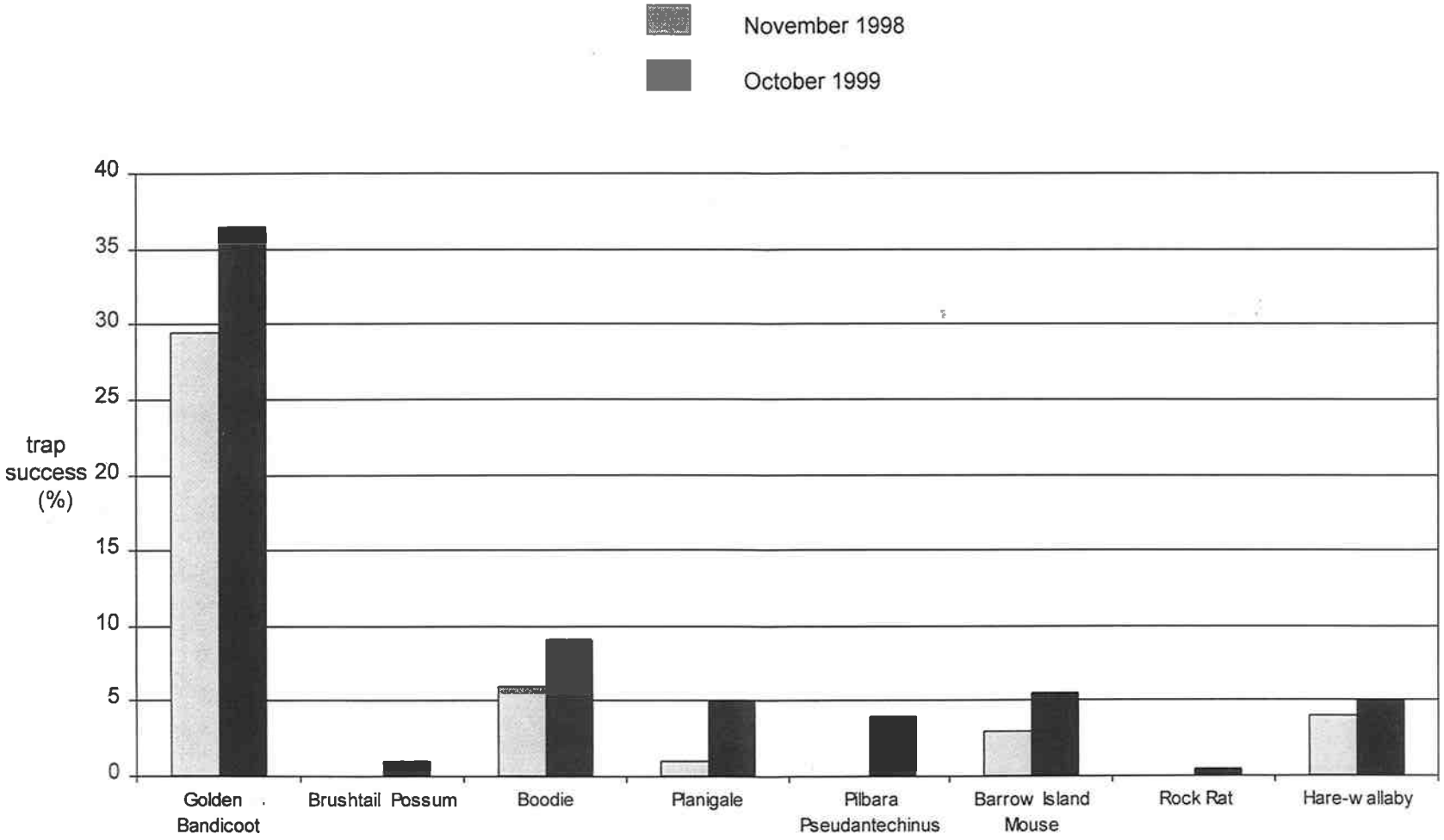


Figure 2. Mammal trap success rates on the John Wayne grid

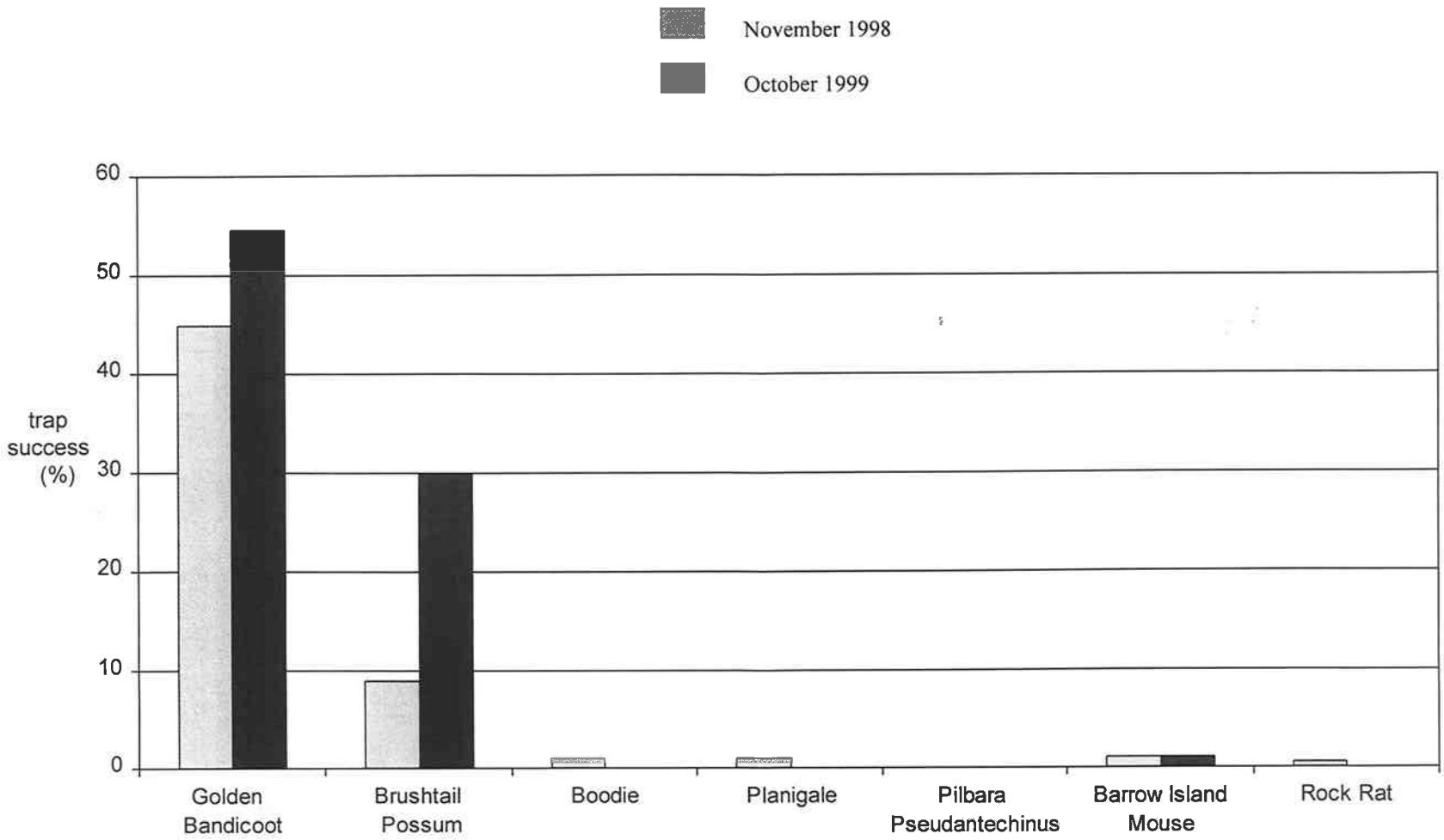


Figure 3. Mammal trap success rates on the Landing grid

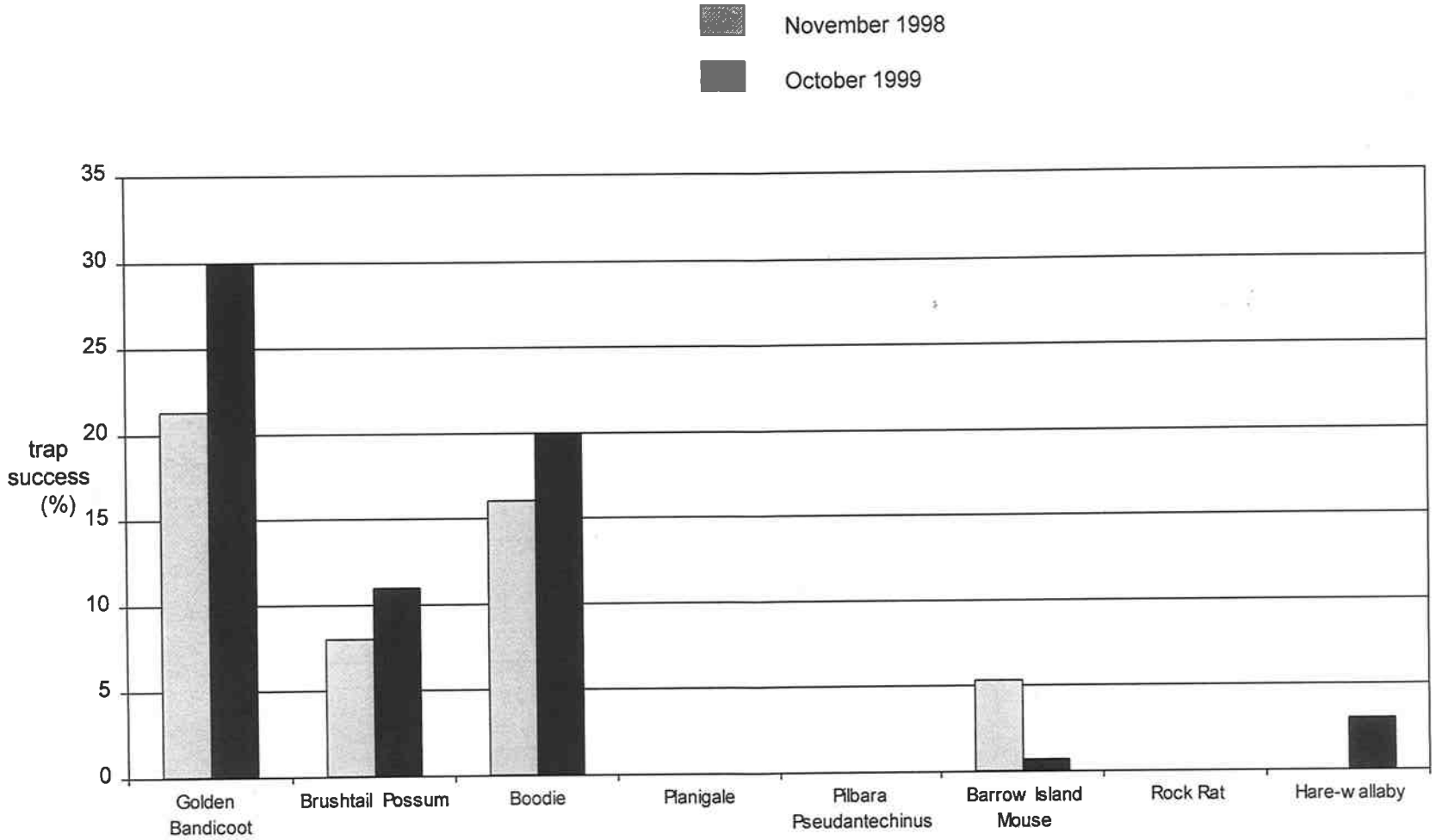


Figure 4. Mammal trap success rates on the M21 grid

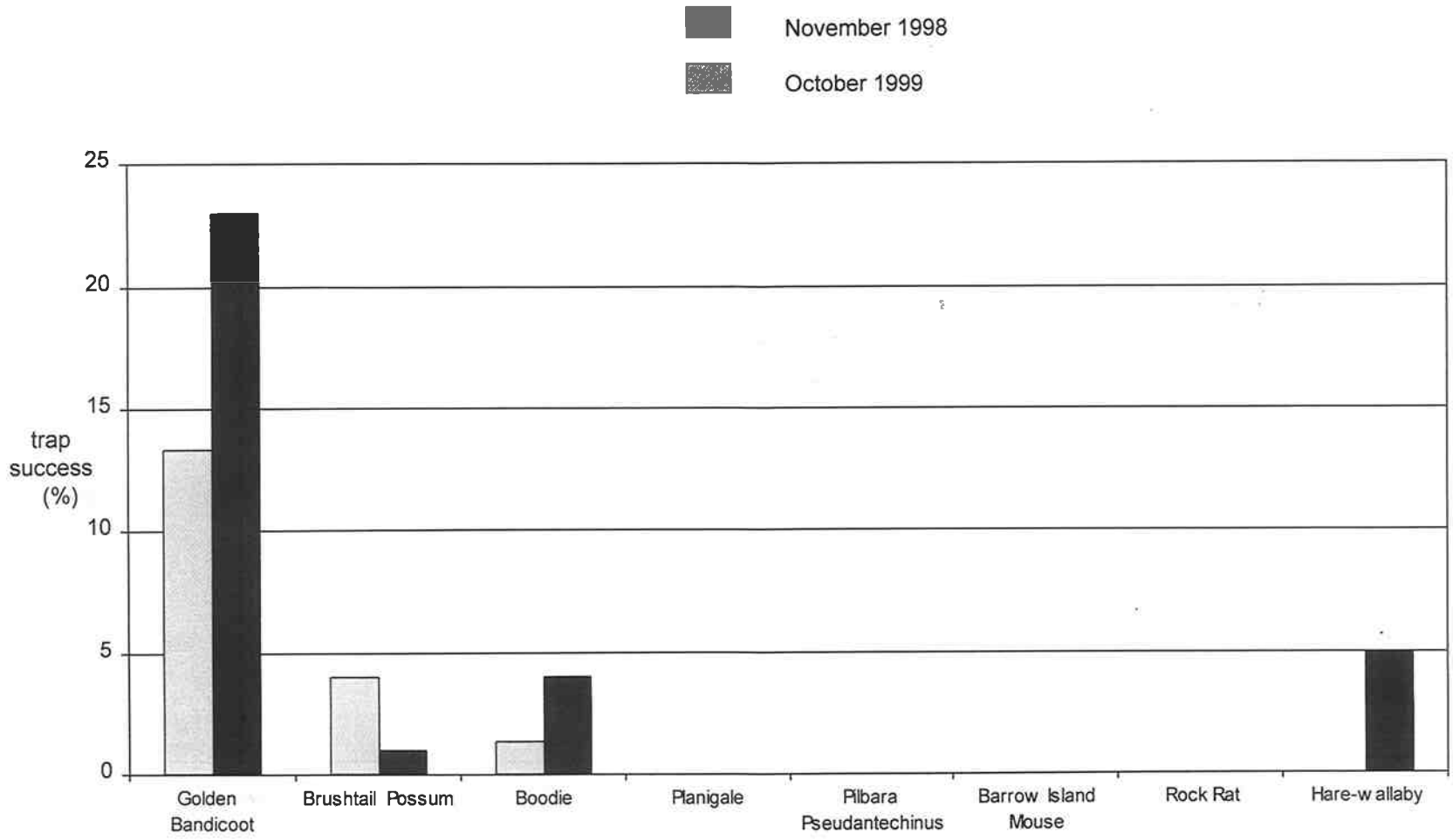


Figure 5. Mammal trap success rates on the S62 grid

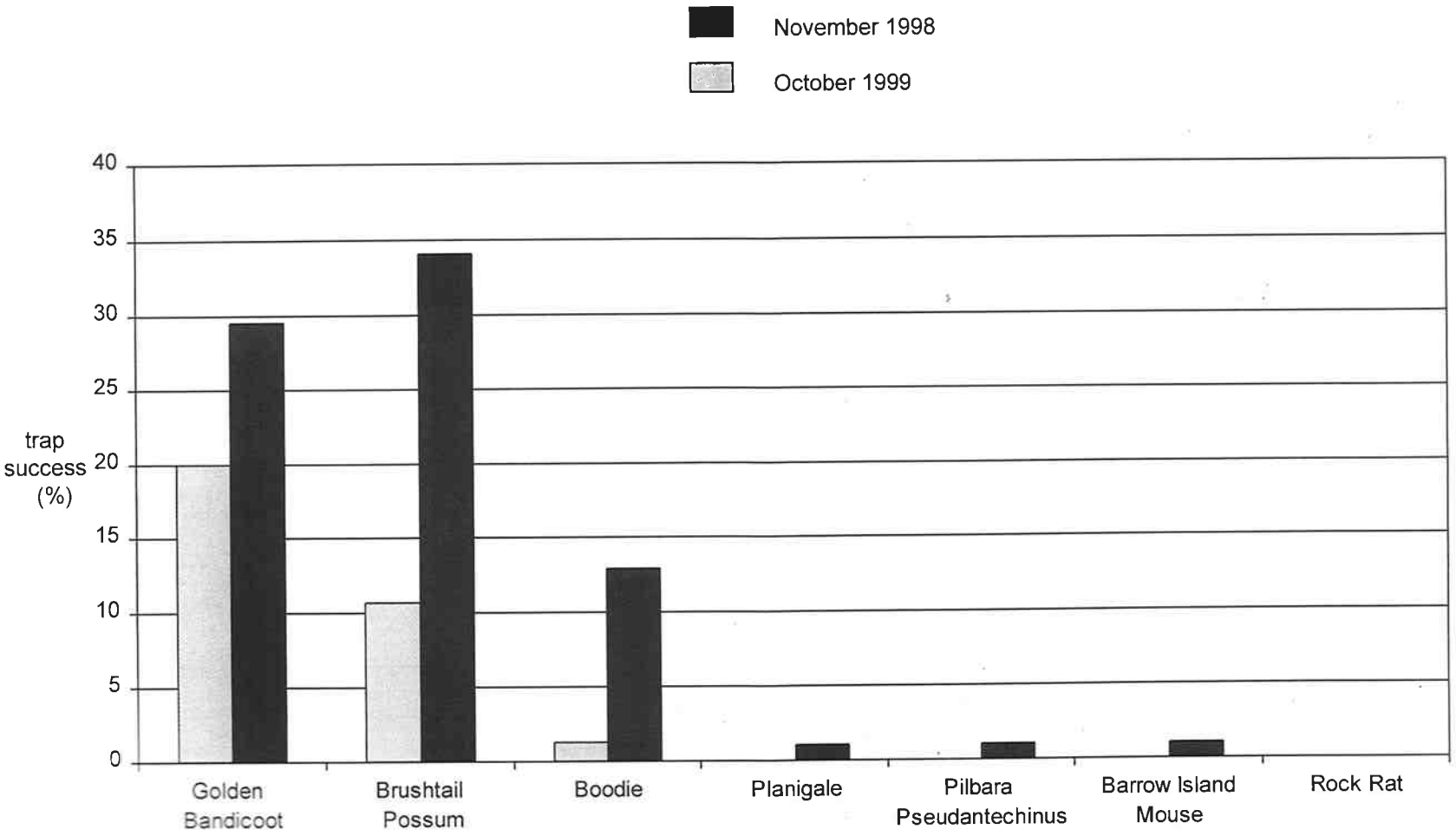


Figure 6. Grid trap success rates for the Golden Bandicoot on Barrow Island

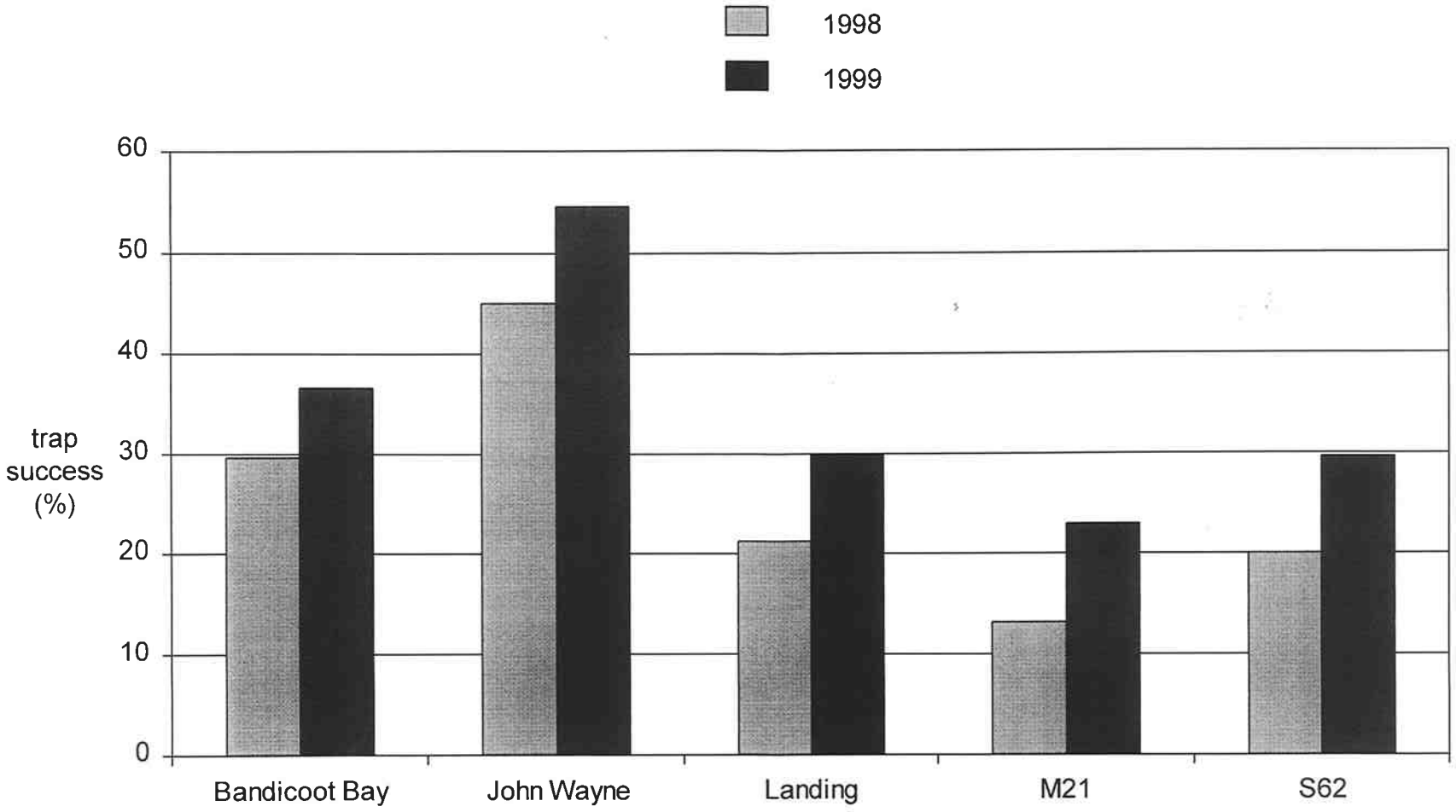


Figure 7. Grid trap success rates for the Brushtail Possum on Barrow Island

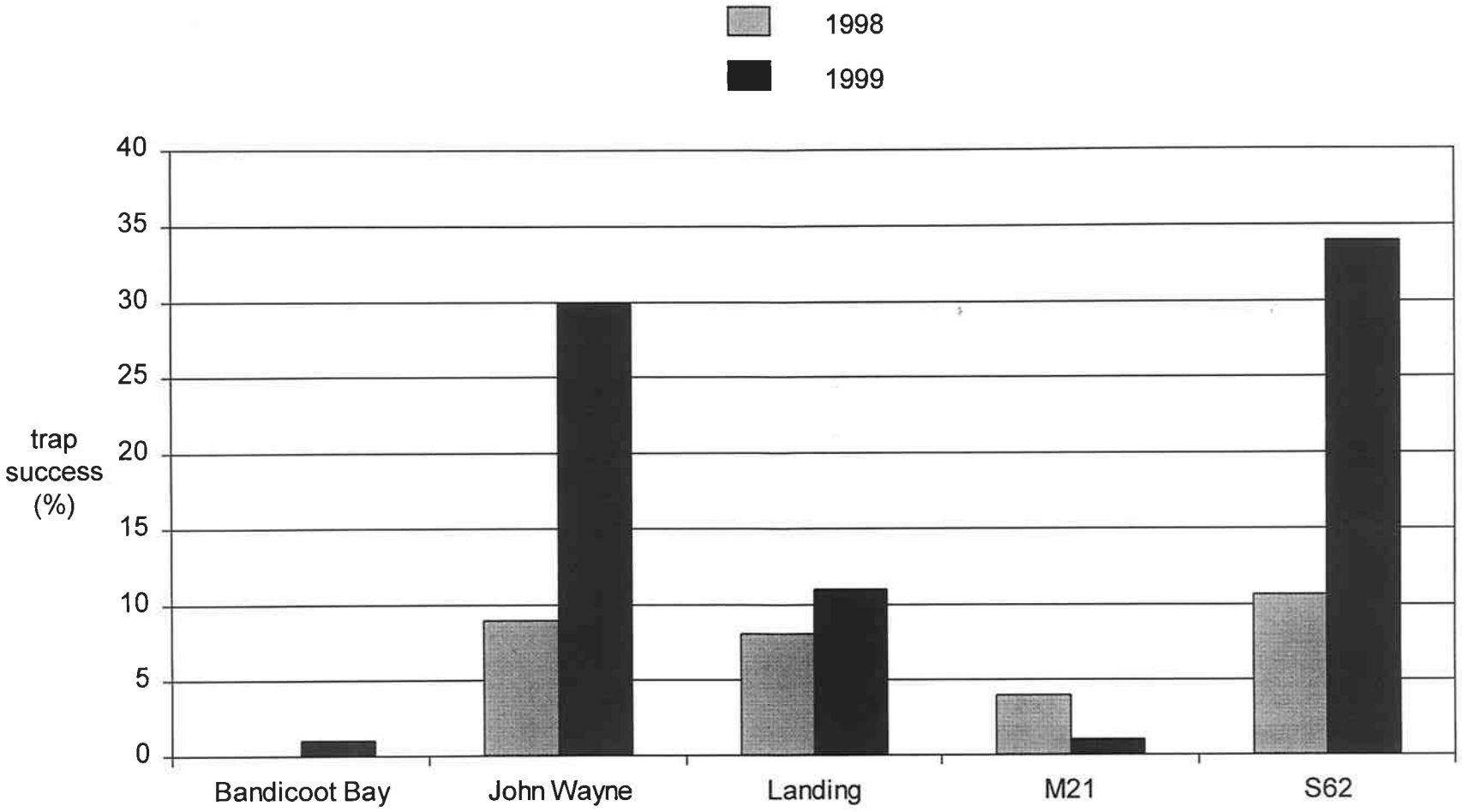


Figure 8. Grid trap success rates for the Boodie on Barrow Island

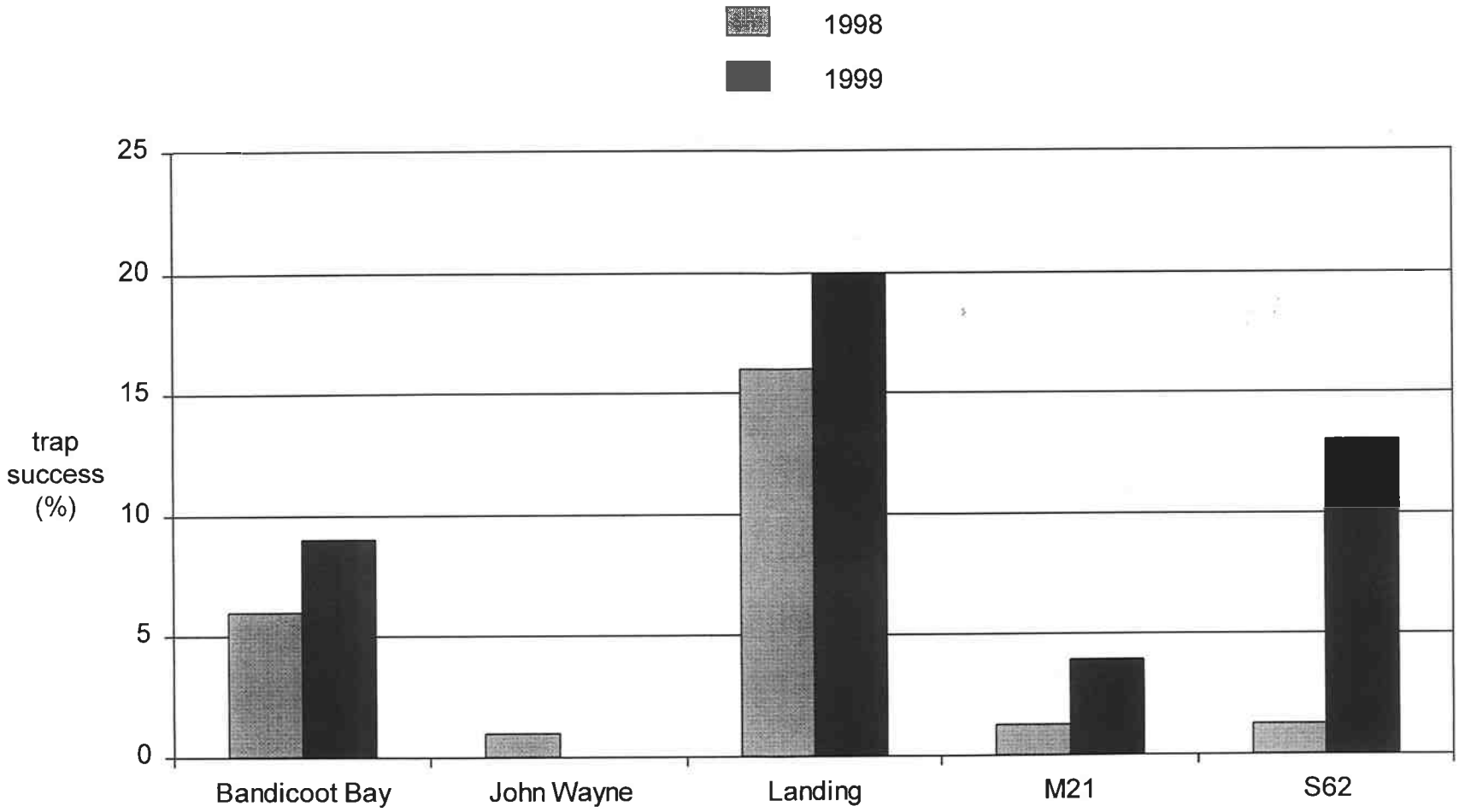


Figure 9. Grid trap success rates for the Planigale on Barrow Island

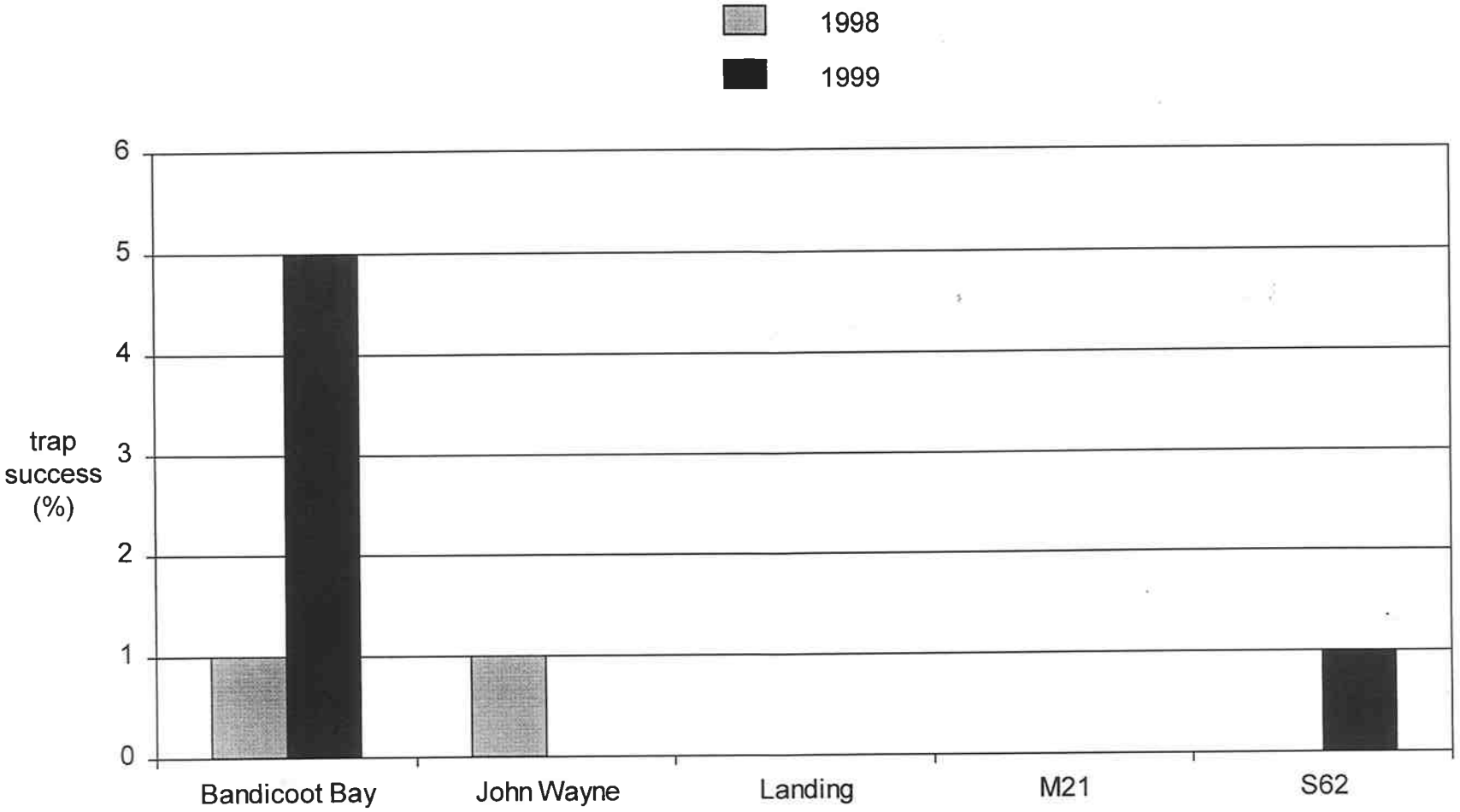


Figure 10. Grid trap success rates for the Pilbara Pseudantechinus on Barrow Island

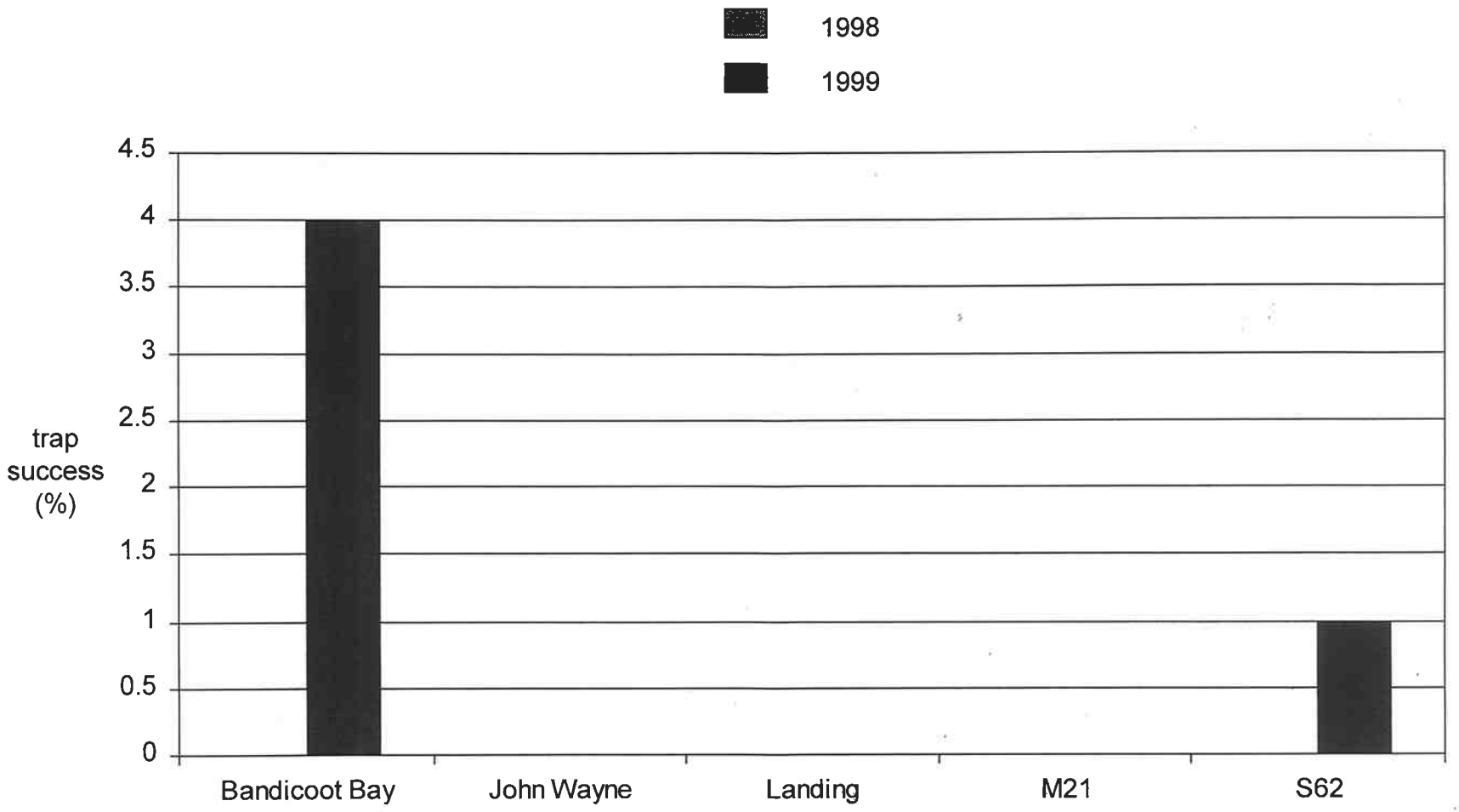


Figure 11. Grid trap success rates for the Barrow Island Mouse on Barrow Island

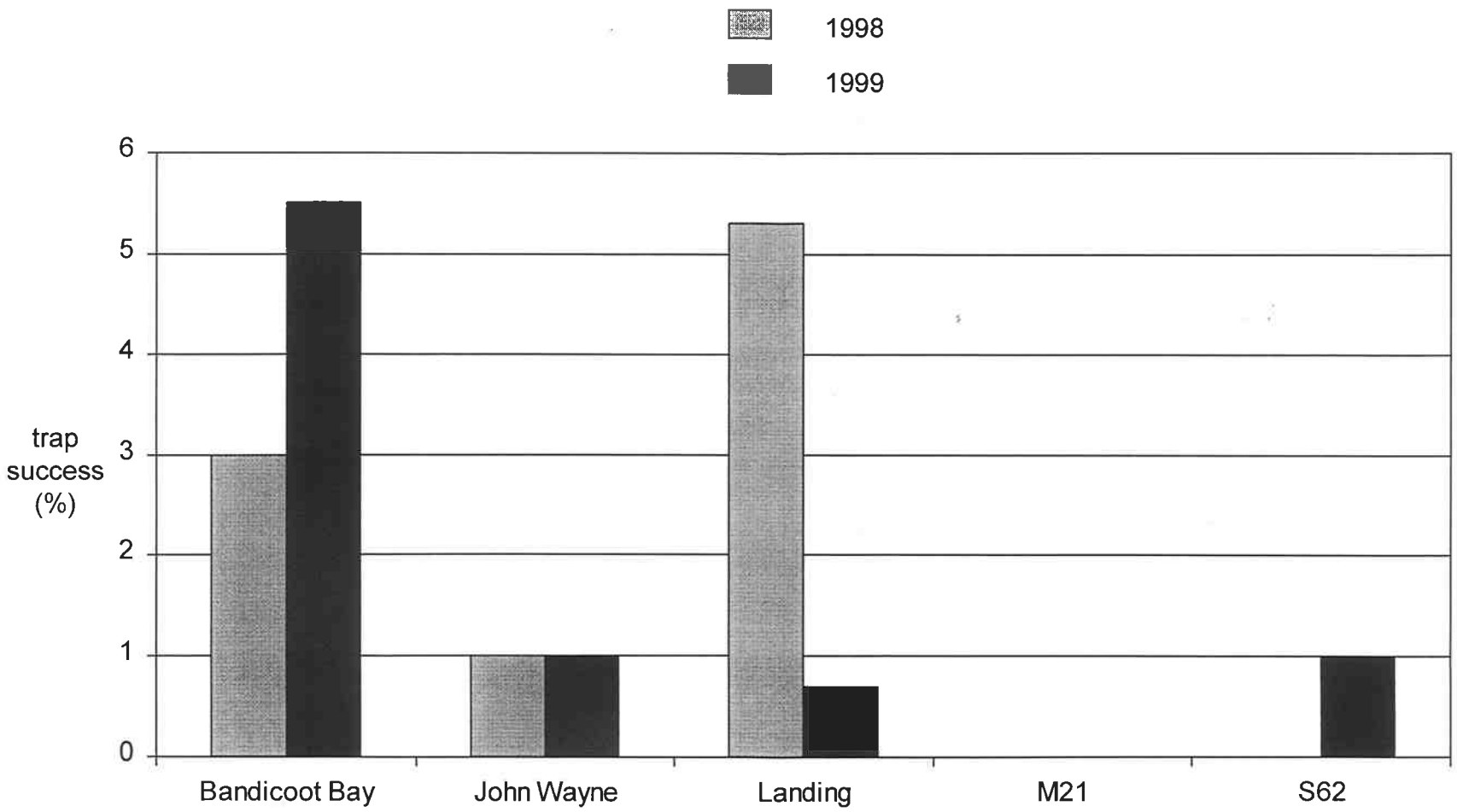
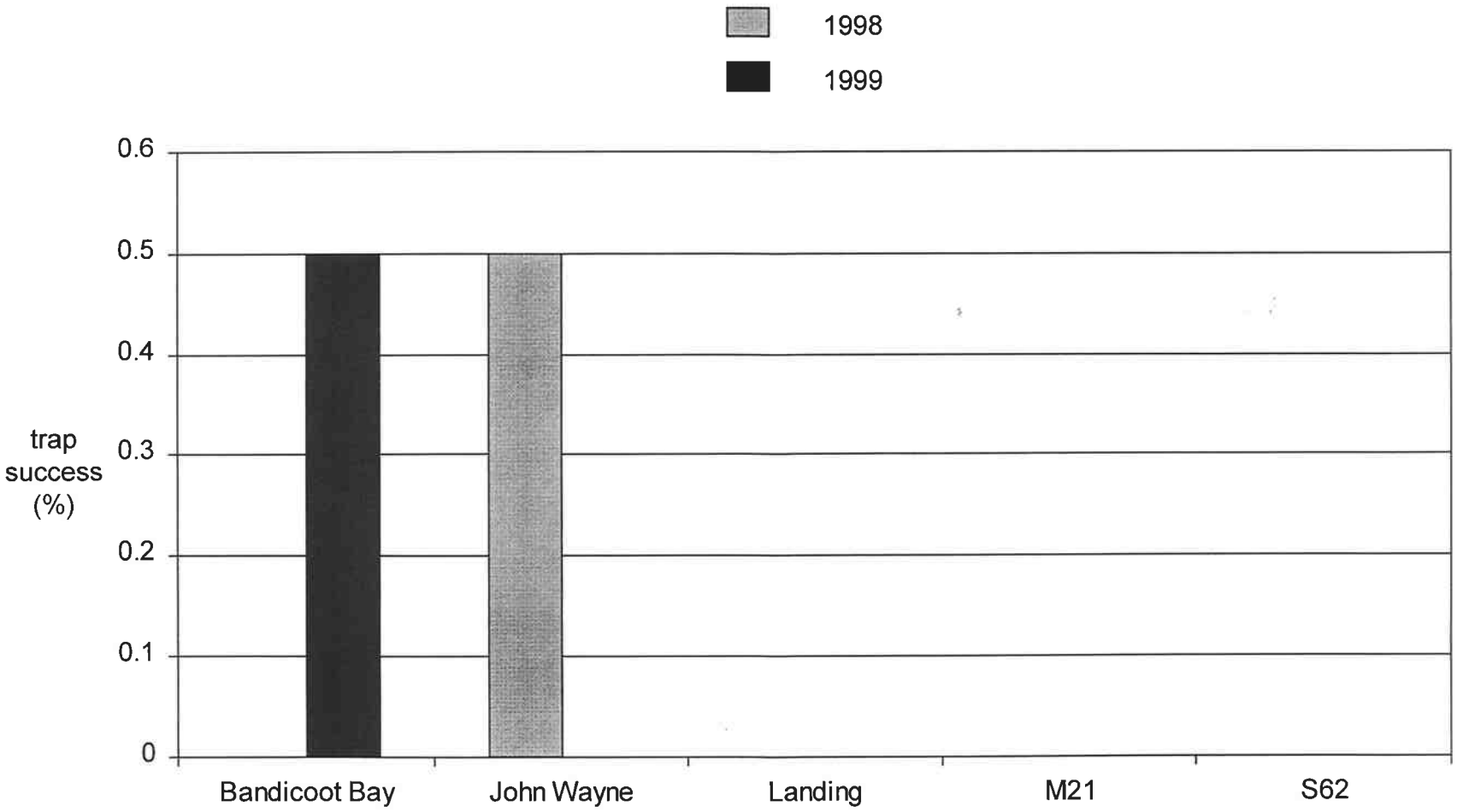


Figure 12. Grid trap success rates for the Rock Rat on Barrow Island



APPENDIX 1

BARROW ISLAND TRAPPING SUMMARY

OCTOBER 1999

JOHN WAYNE GRID

	Golden Bandicoot (200 trapnights)			BT Possum (100 trapnights)			BI Mouse (200 trapnights)		
	N	R	Rt	N	R	Rt	N	R	Rt
12/10/99	10	12	0	1	3	0	1	0	0
13/10/99	6	5	13	4	3	3	0	0	0
14/10/99	7	3	17	1	0	7	0	0	1
15/10/99	7	2	27	1	0	7	0	0	0
Total individuals	**30**	**22**	57	**7**	**6**	17	**1**	**0**	1
% trap success	**54.5**			**30.0**			**1.0**		

BANDICOOT BAY GRID

	G Bandicoot (200 trapnights)			BT Possum (100 trapnights)			Boodie (100 trapnights)			Hare-wallaby (100 trapnights)			Planigale (100 trapnights)			Pseudantech (100 trapnights)			BI Mouse (200 trapnights)			Rock Rat (200 trapnights)		
	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt
12/10/99	12	4	0	0	0	0	1	0	0	1	0	0	1	0	0	3	0	0	2	2	0	0	0	0
13/10/99	7	2	10	0	0	0	2	1	1	2	0	0	2	0	0	0	0	0	1	1	1	1	0	0
14/10/99	4	4	14	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	3	0	0	0	0	0
15/10/99	3	0	13	1	0	0	1	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Total individuals	**26**	**10**	37	**1**	**0**	0	**4**	**1**	4	**5**	**0**	0	**5**	**0**	0	**3**	**0**	1	**7**	**3**	1	**1**	**0**	0
% trap success	**36.5**			**1.0**			**9.0**			**5.0**			**5.0**			**4.0**			**5.5**			**0.5**		

S 62 GRID

	G Bandicoot (200 trapnights)			BT Possum (100 trapnights)			Boodie (100 trapnights)			Planigale (100 trapnights)			Pseudantech (100 trapnights)			Bl Mouse (200 trapnights)		
	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt
16/10/99	3	6	0	4	0	0	2	1	0	0	0	0	1	0	0	1	0	0
17/10/99	7	2	5	7	1	4	3	0	0	1	0	0	0	0	0	1	0	0
18/10/99	4	3	6	4	0	7	4	0	1	0	0	0	0	0	0	0	0	0
19/10/99	7	0	16	3	0	4	1	0	1	0	0	0	0	0	0	0	0	0
Total individuals	**21**	**11**	27	**18**	**1**	15	**10**	**1**	2	**1**	**0**	0	**1**	**0**	0	**2**	**0**	0
% trap success	**29.5**			**34.0**			**13.0**			**1.0**			**1.0**			**1.0**		

M 21 GRID

	G Bandicoot (200 trapnights)			BT Possum (100 trapnights)			Boodie (100 trapnights)			Hare-wallaby (100 trapnights)		
	N	R	Rt	N	R	Rt	N	R	Rt	N	R	Rt
16/10/99	8	3	0	0	0	0	0	0	0	1	0	0
17/10/99	5	0	6	1	0	0	1	0	0	1	0	0
18/10/99	3	0	10	0	0	0	2	0	0	2	0	0
19/10/99	4	0	7	0	0	0	1	0	0	1	0	0
Total individuals	**20**	**3**	23	**1**	**0**	0	**4**	**0**	0	**5**	**0**	0
% trap success	**23.0**			**1.0**			**4.0**			**5.0**		

LANDING GRID

	G Bandicoot (200 trapnights)			BT Possum (100 trapnights)			Boodie (100 trapnights)			Hare-wallaby (100 trapnights)			Bl Mouse (150 trapnights)		
	N	**R**	**Rt**	**N**	**R**	**Rt**	**N**	**R**	**Rt**	**N**	**R**	**Rt**	**N**	**R**	**Rt**
16/10/99	7	3	0	1	0	0	6	0	0	1	0	0	1	0	0
17/10/99	3	2	10	2	0	0	3	0	2	0	0	0	0	0	0
18/10/99	3	0	13	2	0	2	0	0	4	1	0	0	0	0	1
19/10/99	2	0	17	2	0	2	1	0	4	1	0	0	0	0	0
Total individuals	**15**	**5**	40	**7**	**0**	4	**10**	**0**	10	**3**	**0**	0	**1**	**0**	1
% trap success	**30.0**			**11.0**			**20.0**			**3.0**			**0.7**		