BANKWEST LANDSCOPE CONSERVATION VISACARD

Radio-tracking of Gilbert's Potoroo

Final report

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Introduction

Gilbert's Potoroo *Potorous gilbertii* was described as a now species by Gould in 1845 from specimens collected near Albany by John Gilbert in 1853. The last specimen found during the 19th century is credited to William Webb, between 1874 and 1879. Ride (1970) treated *Potorous gilbertii* as a synonym of *P. tridactylus*, previously described from south-eastern Australia. It was only when new material became available after the rediscovery of the species at Two Peoples Bay near Albany by Elizabeth Sinclair in 1994 that the animal was restored to species status (Sinclair and Westerman 1997).

The dense scrub on Mount Gardner, in Two Peoples Bay Nature Reserve, is home to Gilbert's Potoroo. Despite searches in similar habitat in the same area, no other populations have been discovered. Due to its low numbers and the vulnerability of the single population to extinction, the species is classified as Critically Endangered.

Trapping and hair-tubing have been used to survey Two Peoples Bay Nature Reserve and three separate colonies have been located, in dense shrubland in areas known as Firebreak Valley, Hakea and West 6. Regular trapping in all colonies rarely yields more than ten individuals in total.

Knowledge of the species' habitat requirements, spatial and social organization is required if practical plans to establish new populations are to be formulated. The habitat in which these animals live gives little or no opportunity to observe the animals, so indirect methods must be employed. In 1997 an honours student used cotton spooling to elucidate short-term movement and feeding pathways for several potoroos (Vetten 1996). Trapping can provide good information on demographic aspects such as population structure, reproduction and longevity and limited information on home range and dispersal of young. By use of these methods in conjunction with radio-tracking, however, a comprehensive understanding of key elements of the species' biology can be achieved.

Aims

The aims of this study were to follow the movements of individual Gilbert's potoroos in the Firebreak Valley colony by fitting radio-tags and tracking them from remote station over two weeks in order to answer the following questions:

- Do potoroos occupy discrete home ranges, overlapping home ranges, or do they drift?
- What is the activity pattern of potoroos?

Methods

Gilbert's potoroos were trapped along regular trap lines in Firebreak Valley during early February 2000. All six animals caught (five males, one female: see Table 1) were fitted with tail tags manufactured by Sirtrack (NZ). Each tag contained a 2-stage transmitter operating at 3V and weighing 8g with a life of 54 days and a range of 500m ground-to-

ground. The tag packages were elongate and roughly cylindrical, with a convex surface on one side to fit more closely when mounted longitudinally on the tail. At the posterior end a 20-cm braided cable whip aerial came out of the package so that it trailed behind the animal. The tag was attached dorsally at the base of the tail with 10 cm width Elastoplast wrapped around both the tail and the tag, so that it was not tight but adhered closely. Animals were trapped again after the tracking period so that tags could be removed.

Three tracking stations were established in Firebreak Valley giving a good coverage of the study site (see Figure 1). Each station comprised a rotating tracking mast, a directional null-peak antenna system (Telonics TA-NS-8) and a shelter for the tracker. A needle mounted on the mast indicated the bearing to the animal on a fixed compass rose.

Tracking was carried out 24 hours a day for two weeks, with the exception of two days after the transmitters fell off and a day for a team changeover. Trackers worked six-hour shifts, taking bearings at 20-minute intervals on all animals. With each bearing, an activity rating based on the constant or fluctuating volume of the transmitter signal ("steady" or "variable") was recorded for that animal. These details were entered onto a data sheet and later all data were entered as input files for the program LOCATE. Locations for each animal were calculated using this program, generating a file of fixes (location file) for each animal. LOCATE generates an error term for each fix and this was used to select the more accurate data for mapping (area of error ellipse less than 20 000 m^2). Location data were mapped with the program ArcView and superimposed onto an aerial photograph of the study site (Figure 1). Analysis of home range will be carried out with the program RANGES V.

Fieldwork completed

Trapping to fit transmitters:	8-14 February 2000
Tracking	14-28 February 2000
Trapping to remove transmitters	6-17 March 2000

Table 1. Details of potoroos fitted with radio-tags in Firebreak Valley, Two Peoples Bay, during February 2000.

Animal #	Sex	Age (yr)	Age class	Weight (g)	Mother
25	F	4	Adult	960	
45	M	0.5	Juvenile	510	25
24	M	3.5	Adult	1060	23
26	M	>4.5	Adult	900	
37	M	2	Adult	965	
40	M	1	Subadult	820	23

Major findings

- Potoroos were almost only active in darkness. Very few movements occurred during daylight hours.
- The adult males moved more widely than the juvenile and subadult males or the female.
- During the two weeks of the study, individual potoroos occupied stable home ranges.
- All adult males and the subadult male occupied discrete home ranges.
- The subadult male had been caught first as the pouch young of female 23 in the southern part of the study site, but had clearly established a home range in the northern part.
- There was extreme overlap between the home ranges of the female, the juvenile male (her offspring) and one of the adult males.
- The two older males apparently left the valley for short periods at various stages during the two weeks by moving over the ridge to the west.
- The juvenile male was still living in his mother's home range and nested with her on some, but not all days.

Conclusions

Overlap between Gilbert's Potoroos seems to be associated with a reproductive group, possibly a family unit. Males and females readily nest together in captivity and one nest found in the wild during 1999 contained two adults and a juvenile. Males' home ranges do not overlap, however. In some elements this mode of spatial organization is quite similar to that displayed by the long-footed potoroo, according to Green *et al.* (1998).

Costs

The costs proposed in the application ($4500) comprised additional tracking antenna units, to provide five tracking stations, to cope with the rugged terrain and reflection from the granite outcrops at Two Peoples Bay. The results of a pilot project in April 1999 showed that three stations worked quite adequately, so the grant was put towards supporting the large workforce necessary to carry out round-the-clock tracking.

Costs		**$**
Volunteer food	15 persons, 2 weeks	827.53
Accommodation	Research quarters plus 2 caravans, 2 weeks	895.00
Tents for stations	3 x change tents @ $110	330.00
Plant costs	2834 km @ 65 cents/km	1842.10
Radio-tags	6 tail transmitters@ $255	1530.00
Total		**5424.63**

Acknowledgements

This project involved many people and all contributed to its success. I would like to thank Tania Butler for assistance before, during and after the tracking period. The twenty volunteers spent many hours in the sun, wind, rain and darkness and still managed to enter a large amount of the data, to help feed the captive potoroos and assist in constructing the extensions to the captive breeding facility. Bill and Helen Crisp went far beyond the call of duty to come into the office over the following month to finish all the data entry. Very special thanks are due to super-volunteer Amelia Moir, who not only cooked wonderful meals and looked after all the catering arrangements, but made the Two Peoples Bay quarters a welcoming home for us all for two weeks.

References

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Figure 1. Firebreak Valley Potoroos, February 2000