THEVENARD ISLAND MOUSE RECOVERY TEAM

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by

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for

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Actions implemented for the management of the short-tailed mice on Thevenard Island are discussed. Analysis of mitochondrial DNA indicated divergence within L. lakedownensis taxon, between the Pilbara and Kimberley. House mice continue to remain higher in abundance than short-tailed mice on Thevenard Island throughout the year. The feral cat was removed from Serrurier Island early in 1996 and a translocation of short-tailed mice to Serrurier Island was successfully completed in October.

INTRODUCTION

In 1986 house mice *Mus domesticus* were first reported on Thevenard Island. Concern for the population of native short-tailed mice *L. lakedownensis* on Thevenard Island increased after the house mice reached plague numbers. The conservation significance of this island population was uncertain, and general baiting for house mice was not an immediate option because of the threat of eliminating the only island population of these short-tailed mice. Tolerance to 1080 poison was found to be higher in *M. domesticus* than in *L. lakedownensis* (Morris 1989), and both species had similar bait preferences. General and non-specific baiting was therefore not considered an option.

The implementation of five management actions detailed in the Thevenard Island mouse Interim Wildlife Management Guidelines (IWMG, Morris 1993) were considered necessary for implementation to ensure the protection of Thevenard Island *Leggadina*. These actions commenced in 1994 and formed part of a PhD by Mr Dorian Moro at The University of Western Australia (UWA). This thesis is completed (it is now with examiners), and recommendations for the management of the native mice and control of house mice are included within it.

This report addresses research completed during 1997 on those actions listed in the Thevenard Island mouse IWMG.

RECOVERY TEAM

Membership

At the end of 1997, it was proposed that the Recovery Team be expanded by two members. During 1996/97, work was undertaken on the distribution and field ecology of mainland *Leggadina* by environmental staff of Hamersley Iron Pty Ltd (HI), and on taxonomic relationships by staff of the WA Museum (WAM). These organisations were invited to nominate representatives to the Recovery Team, and both responded positively. HI nominated Stuart Anstee, Ecologist in Environmental Affairs, and WAM nominated the Curator of Mammals, with Norah Cooper delegated to attend in place of Dr Kitchener until he returns to WA in June 1998.

Ms Anne Duncan replaced Ms Sally Stevens as Environment Australia's representative on the Recovery Team.

This expansion resulted in the Recovery Team listed below:

Dr Peter Kendrick (Chair)	CALM Karratha
Mr Keith Morris	CALM Woodvale
Dr Andrew Burbidge	CALM WATSCU
Ms Anne Duncan	Environment Australia
Mr Dorian Moro	UWA
Professor Don Bradshaw	UWA
Mr Stephan Fritz	West Australian Petroleum (WAPET)
Ms Norah Cooper	Western Australian Museum
Mr Stuart Anstee	Hamersley Iron Pty Ltd.

Meetings

The sixth meeting of the Thevenard Island Mouse Recovery Team was held in September 1997, at Woodvale. Work performed by other agencies (HI and WAM) relevant to *Leggadina* was discussed, and it was agreed that a further meeting be held with these other agencies. This meeting of some members of the Recovery Team occurred in December, at HI's offices in Perth, following which HI and WAM were invited to nominate representatives. The December meeting was not a formal meeting of the Recovery Team.

PROJECT STATUS AND FUNDING

Dorian Moro has completed both the field and laboratory components of his work, and has submitted his PhD thesis reporting these data in late 1997.

Mr Moro has submitted a paper (with co-authors) reporting the results of mitochondrial DNA comparisons within *Leggadina*.

Norah Cooper (with Linc Schmidt, University of Western Australia, and Mark Adams, Evolutionary Biology Unit, SA Museum) have in manuscript form a paper reporting the results of genetic (allozyme) and morphological comparisons within *Leggadina*.

Future funding for the following three years has been sought from the Threatened Species and Communities Section (Biodiversity Group, Environment Australia), and from West Australian Petroleum (WAPET), with the aim of downgrading the taxon from 'endangered' to 'vulnerable' (IUCN 1994). This review will be completed in April 1998.

Financial support during 1997 was obtained from ANCA's Endangered Species Program, the University of Western Australia, and WAPET. Mr D. Moro continued to receive a Commonwealth Post Graduate Scholarship for his PhD.

PROGRESS ON RECOVERY ACTIONS DURING 1997

Research on the Thevenard Island short-tailed mouse continues to follow five actions as listed in the Thevenard Island Mouse IWMG.

Action 1: *Determine the taxonomic status of the Thevenard Island mouse*

Two studies have undertaken taxonomic or systematic investigations of *Leggadina*. One (Moro *et al.*, in press) has used mitochondrial (mtDNA) genome, while the other (Cooper *et al.*, in prep.) has used both nuclear genome (allozyme) and morphological comparisons. Moro's study confirms that the Pilbara *Leggadina lakedownensis* show distinct mitochondrial DNA differences to Kimberley populations, but that the Thevenard Island population is indistinguishable from the mainland Pilbara *Leggadina*. Cooper *et al.* have found that allozyme comparisons fail to distinguish Kimberley and Pilbara *Leggadina* (including the Thevenard Island populations), and that morphological variation appears to be clinal (with size decreasing from Thevenard Island, through mainland Pilbara to the Kimberley populations). These authors found no basis for taxonomic subdivision within *Leggadina lakedownensis*.

Action 2: *Assess the current status of L. lakedownensis and Mus domesticus on Thevenard Island*

No additional trapping was undertaken on Thevenard Island in 1997. Data collected between 1994 - 1996 are presented below.

Trapping effort from January 1996 to December 1996 totalled 3390 trap-nights, and the mark-release-recapture study resulted in 626 house mice and 189 short-tailed mice being captured at least once. The house mouse : short-tailed mouse ratio peaked in January at 16.0. We now understand that the populations of both mice fluctuate throughout the year (Fig. 1), and may be related to past rainfall events in the area.

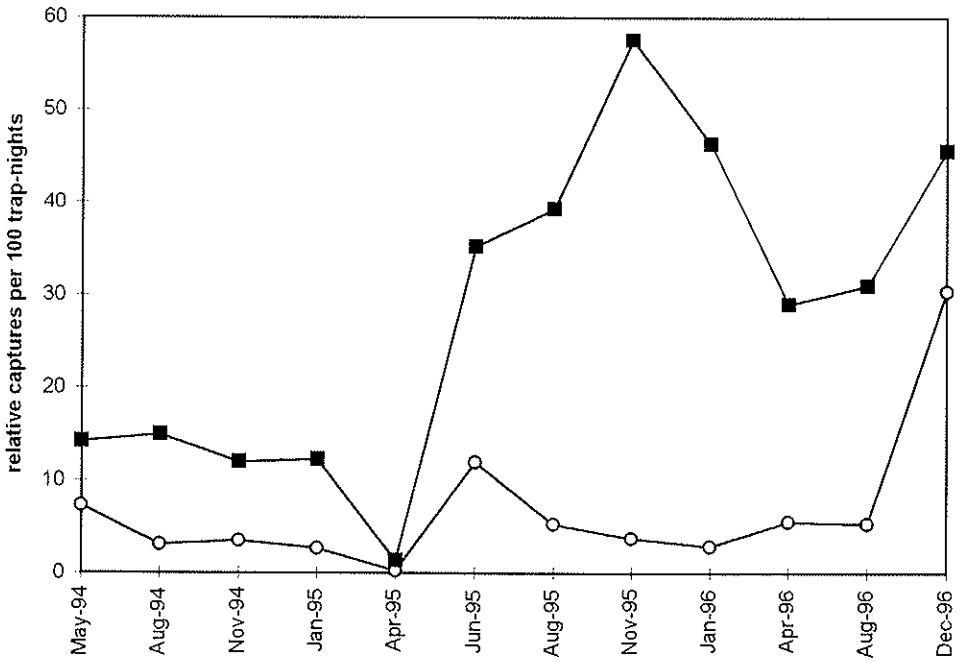

Figure 1. Relative density of mice captured on Thevenard Island since 1994, expressed as a relative index per 100 trap-nights (--o-- L. *lakedownensis*, --o-- *M. domesticus*).

During 1996, population estimates for house mice on Thevenard Island fluctuated between 4000-6500, compared with 600-3500 short-tailed mice. House mice are distributed across Thevenard Island, and were more abundant early and late in the year during a time of juvenile dispersal. The short-tailed mice were more abundant late in the year when juvenile captures were highest. Sex ratios were parous for both species except for house mice during January, when there was a male bias in the population.

Action 3: Translocate the Thevenard Island short-tailed mouse to another island

The translocation of *L. lakedownensis* from Thevenard Island to Serrurier Island appears to have been successful. *Leggadina* were released at the southern end of the island in October 1996. Monitoring in January 1997 indicated that the mice had survived on the southern end of the island. By mid August 1997, they had spread to the northern (larger) part of the island. Large numbers of burrows and mouse tracks were observed, indicating a large increase in population size from the initial 63 individuals. Four permanent monitoring grids were established at this time.

Action 4: *Develop a technique to control or eradicate house mice on Thevenard Island*

Characterisation of ecophysiological and viral differences between house mice and Thevenard Island *Leggadina* have not led to cost effective or realistic proposals for eradication of house mice on Thevenard Island in the presence of *Leggadina*.

It is proposed that a bait station be developed that selectively excludes *Leggadina* from second generation anti-coagulant bait (such as commercially available Talon). Such a bait station would exploit the inability of *Leggadina* to climb as efficiently as *Mus*, thus denying them access to the bait and any attractant used. Proposed bait station designs and initial testing have been undertaken by Mr Moro. This design will be field trialed by CALM in 1998.

Action 5: Prepare a Recovery Plan

Recently, Hamersley Iron Pty Ltd and biological consulting groups working for other iron ore miners discovered a series of populations of *Leggadina* in areas of the inland Pilbara (central and eastern Hamersley Ranges, and Chichester tablelands). These recently discovered populations require that the status of Pilbara *Leggadina lakedownensis* be reviewed, and possibly downgraded from 'endangered' under the IUCN (1994).

Mr Moro has prepared separate monitoring protocols for both the Thevenard Island and Serrurier Island populations of *Leggadina*. These will be used as a basis for future monitoring.

EDUCATION AND PUBLICITY

Mr Moro was awarded the 1997 Minerals Council of Australia Student Research Award, presented at the Minerals Council of Australia 1997 Environmental Workshop in Adelaide, in October 1997 (Moro 1997).

Papers and reports produced during 1997 included:

Moro, D. 1997. The house mouse *vs* science. Is selective control possible. Proceedings of the Mineral Council of Australia, 1997.

Moro D. 1997 Removal of a feral cat from Serrurier Island. The Western Australian Naturalist 21: 153-156.

Moro, D. 1997. PhD thesis, submitted for review.

Moro, D. 1997. Efficiency of baits and bait stations for control of house mice.

Moro, D, *et al.* 1997. The Thevenard Island Mouse: historic and conservation implications from mt-DNA sequence variation. In prep.

FUTURE PERSPECTIVE OF PROJECT

Mr Moro has completed the write-up of his PhD thesis in 1997. However, continued monitoring will be required of both the Thevenard Island and Serrurier Island populations. Hamersley Iron will continue to monitor the Tom Price *Leggadina* populations. Populations of *L. lakedownensis* on the Chichester tablelands will be monitored by CALM during 1998, targeting areas where *Leggadina* were recently located. Trialing of selective control of *Mus* will be undertaken on Thevenard Island during 1998 by CALM.

CONCLUSION

Depending upon the outcome of the review of the conservation status of Pilbara *Leggadina*, continued maintenance of the Recovery Team may be unwarranted. Advice on this matter will be forwarded to CALM's Director of Nature Conservation and Environment Australia once the review is completed. Field implementation of recovery actions for Pilbara *Leggadina* will continue in 1998. Monitoring of island and mainland populations will proceed, including the translocated Serrurier population. Field trials of *Mus* control techniques (selective bait stations) will also be undertaken. Taxonomic assessments of the Pilbara populations of *Leggadina* will be completed and submitted for publication in 1998.

REFERENCES

IUCN (1994). IUCN Red List Categories. IUCN Species Survival Commission, Gland, Switzerland.

Morris, K. D. 1989. The conservation of *Leggadina* (Muridae) on Thevenard Island, Western Australia. Proceedings of the Australian Mammal Society meeting, Alice Springs, April 1989.

Morris, K. D. 1993. Interim wildlife management guidelines for the Thevenard Island Mouse, *Leggadina* (aff.) *lakedownensis*. Unpublished report, CALM.