THEVENARD ISLAND MOUSE RECOVERY TEAM

ANNUAL REPORT

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by

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for

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1. SUMMARY

Actions implemented for the management of the short-tailed mice on Thevenard Island are discussed. Genetic analyses failed to identify taxonomic subdivision within the L. lakedownensis group. An assessment of the conservation significance of short-tailed mice from the Pilbara indicates that it does not fall into any of the IUCN categories of threatened fauna, however the Thevenard Island population warrants special management. House mice continue to remain higher in abundance than short-tailed mice on Thevenard Island. Translocation of Leggadina to Serrurier Island appears to have been successful, but the translocated population will need to continue to be monitored.

2. INTRODUCTION

Thevenard Island supports a large form of the short-tailed mouse, (*Leggadina lakedownensis*,), as well as a WA Petroleum shore base and production facility, and tourist resort. House mice (*Mus domesticus*) were introduced to Thevenard Island in the mid 1980s, and concern for the population of short-tailed mice on the island increased after *Mus* reached plague numbers soon after.

Implementation of five management actions detailed in the Thevenard Island Mouse Interim Wildlife Management Guidelines (IWMG, Morris 1993) were considered necessary to ensure the protection of the short tailed mice inhabiting Thevenard Island. These actions commenced in 1994 and formed part of a Ph.D. by Dorian Moro at the University of Western Australia (UWA), submitted in 1997 (Moro 1997).

This report addresses progress made during 1997/98 on actions listed in the Thevenard Island mouse IWMG.

3. RECOVERY TEAM

3.1 Membership

Membership was unchanged from 1997.

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

3.2 Meetings

The Thevenard Island Mouse Recovery Team met in March 1998, at the Wildlife Research Centre, Woodvale. All agencies were present except Environment Australia and WA Petroleum. Minutes of that meeting are attached.

4 PROJECT STATUS AND FUNDING

The initial three years funding resulted in completion or substantial progress toward the five actions listed in the original project specifications. Original action items were

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

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

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

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

Action 5: Prepare a Recovery Plan

The outcomes are detailed below.

Following completion of the first three year project, it was felt that additional follow up was needed in a number of areas. This will be discussed separately below.

5. PROGRESS ON RECOVERY ACTIONS TO 1998

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

Two studies have compared the genetic composition of Thevenard Island *Leggadina* with mainland populations. Moro *et al.* (1998) used mitochodrial DNA (mtDNA) comparisons, while Cooper *et al.* (in prep.) performed both protein analysis (allozyme) and morphological comparisons.

Moro *et al.* (1998) found that mtDNA from the Thevenard population of *Leggadina lakedownensis* was indistinguishable from that of mainland Pilbara populations, but that the mtDNA of Kimberley and Northern Territory *L. lakedownensis* was different to Pilbara populations. Cooper *et al.* (in press) found no significant allozyme differences between Kimberley, Pilbara mainland and island populations. They also showed that morphological differences between these populations appear to be clinal, with Thevenard *L. lakedownensis* larger than Pilbara mainland *L. lakedownensis*, which are larger than Kimberley *L. lakedownensis*.

These studies indicate that there is no basis to taxonomically separate the Thevenard Island *Leggadina* population as a distinct species from other *L. lakedownensis* . Nor are there grounds to recognise a separate Pilbara taxon. While Moro *et al.*'s study indicates some measure of genetic differentiation between the Kimberley and Pilbara populations, mtDNA is recognised as a very rapidly evolving genome, which often displays intra-specific variation. The clinal nature of morphological variation, and the absence of fixed allozyme differences indicates that taxonomic separation is not justified.

Following consideration of this work, CALM (Dr. A A Burbidge and Dr. P G Kendrick) prepared an assessment of the conservation status of Pilbara *Leggadina* (copy attached). Given there are no taxonomic grounds for recognising the Thevenard population as a taxonomic entity, this assessment found that:

- The Pilbara short tailed mouse (PSTM) is not known to have suffered a population reduction.
- The extent of occurrence of the PSTM is greater than 20 000 square kilometres.
- There has been no documented decline in population numbers.
- PSTM populations are unlikely to be less than 1000 individuals, and more than five populations are known.

The Pilbara *Leggadina* does not meet any of the criteria for any of the IUCN (1994) Red List Categories and is thus not considered threatened. However, the island population has been the subject of translocation. Monitoring of the translocated population is required under CALM's Translocation Policy (Policy Statement #29 Translocation of threatened flora and fauna).

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

Monitoring of *Leggadina* and *Mus* populations on Thevenard and Serrurier Islands was undertaken by D. Moro as a component of his Ph.D. program. Permanent pit and Elliott trapping grids were established and marked. Following the closure of Moro's

field program, monitoring was suspended during 1997.

Moro has prepared separate monitoring protocols for both the Thevenard Island and Serrurier Island populations of *Leggadina* (Moro 1997b, 1997c; copies attached). These will be used as a basis for future monitoring, now undertaken by CALM staff (see below).

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

The translocation of *L. lakedownensis* from Thevenard Island to Serrurier Island has been highly successful. Monitoring in August 1997 showed they were present right across the island. Four permanent monitoring grids were established at this time. Monitoring of this population will proceed in 1998 (see below).

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

Control or eradication of *Mus* from Thevenard Island will rely upon mechanical separation of *Mus* from *Leggadina*. There does not appear to be any practical means of taking advantage of physiological differences detected between the two species, and viral control of *Mus* appears to be unavailable in the near future.

The most practicable approach will depend upon exploiting the pronounced differences in size and agility between *Mus* and *Leggadina*. Moro has trialled bait stations which provide access to bait by climbing; house mice were able to negotiate a vertical climb, while *Leggadina* appeared to be unable to do so. In addition, an access hole to the bait could be of such a size that adult *Leggadina* would be excluded.

Action 5: ***Prepare a Recovery Plan***

The outcomes of taxonomic research into Thevenard *Leggadina* and a re-examination of the conservation status of Pilbara *Leggadina* have resulted in there being no need for a Recovery Plan.

6. EDUCATION AND PUBLICITY 1997/1998

Papers and reports produced during 1997 included:

Moro, D. 1997a. Interactions between native and introduced rodents in an insular environment: strategies for the conservation of the Thevenard Island short-tailed mouse. Unpublished Ph.D. thesis, University of Western Australia, Western Australia, Australia.

Moro, D. 1997b. Mouse population monitoring protocols: Thevenard Island.

Moro, D. 1997c. Mouse population monitoring protocols: Serrurier Island.

Moro, D. (1997). Removal of a feral cat from Serrurier Island. *The Western Australian Naturalist* 21: 153-56.

Moro, D. (1998). Serrurier Island Nature Reserve. Information pamphlet prepared for the Department of Conservation and Land Management, Perth, Western Australia.

Moro, D, Campbell, N.J.H., Elphinstone, M.S., and Baverstock, P.R. (in press). The Thevenard Island mouse: historic and conservation implications from mitochondrial DNA sequence-variation. *Pacific Conservation Biology.*

Moro, D., Lloyd, M., Smith, A., Shellam, G., and Lawson, M. (in press). Murine viruses in an island population of introduced house mice and endemic short-tailed mice in Western Australia. *Journal of Wildlife Diseases.*

Conferences and oral presentations

Moro, D. (1997). The House mouse *versus* science: is selective control possible? Proceedings of the 22nd Annual Minerals Council of Australia Environmental Workshop, Adelaide, South Australia. pp.39-55.

Moro, D., Campbell, N., Elphinstone, M. and Baverstock, P. (1997). The Thevenard Island Short-tailed mouse: taxonomic and conservation implications from mitochondrial DNA sequence variation. Genetics Society of Australia, Perth, Western Australia.

Moro, D., Bradshaw, D. and Morris, K. (1998). Integrating ecophysiology with wildlife research: an example in rodent research. The Australian Mammal Society, Perth, Western Australia.

7. FUTURE PERSPECTIVE OF PROJECT

The Pilbara *Leggadina* project needs to be reappraised given the outcomes listed

above, and the potential future management actions required.

- The Thevenard Island mouse is taxonomically part of the mainland *Leggadina lakedownensis* taxon.
- The Pilbara *Leggadina* do not appear to be significantly differentiated from other (Kimberley) *L. lakedownensis* populations based upon allozyme and morphological criteria.
- The translocated population established on Serrurier requires future monitoring.
- The *L. lakedownensis* population on Thevenard Island is still potentially at risk from *Mus*.

The following management actions require attention.

7.1 Future monitoring; Thevenard I.

To be undertaken by CALM (Karratha). The original monitoring protocol (Moro 1997a) specified four monitoring period per year. This can probably be reduced to two or three. EA funding is required to continue this monitoring.

7.2 Future monitoring; Serrurier I.

To be undertaken by CALM (Karratha). The original monitoring protocol (Moro 1997b) specified once per year. Serrurier Island monitoring can be incorporated into one of the monitoring visits to Thevenard.

7.3 Monitoring of mainland *Leggadina*.

To be undertaken by CALM and Hamersley Iron, as circumstances allow. CALM will install pit traps at sites where *Leggadina* have been recently recorded near Millstream. Hamersley Iron will monitor similar sites near Tom Price when possible.

7.4 Trialling eradication techniques for *Mus*.

Moro trialled bait stations under laboratory conditions, which appeared to successfully separate *Mus* and *Leggadina*. A field trial of this approach may be justified. However, an operational baiting of Thevenard Island (550 ha) would require approximately 16000 bait stations. Experience of successful eradication from Varanus Island (90 ha) indicates that very intensive maintenance of the baiting grid will be required. A project of this scale is not feasible in the near future. However, small scale trials of bait stations can be undertaken in the meantime.

8. ACTIONS UNDERTAKEN IN 1998

8.1 Monitoring of Thevenard mice.

CALM is undertaking monitoring of *Leggadina* and *Mus* populations on both Thevenard Island and Serrurier Island. Three or four trips are planned to Thevenard, and one to Serrurier. So far, one trip has been completed to Thevenard, in June 1998.

Results indicate a healthy population of *Leggadina*, and high numbers of *Mus*. The latest monitoring results are appended to the figure below.

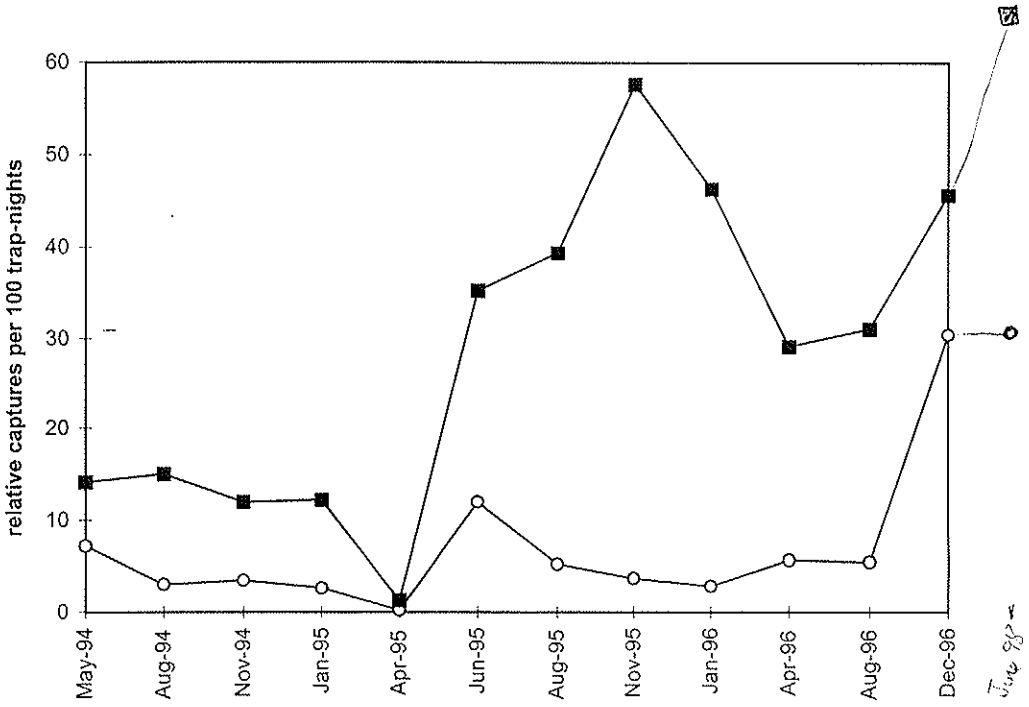

Figure 1. Relative density of mice captured on Thevenard Island since 1994, expressed as a relative index per 100 trap-nights (--o-- L. *lakedownensis*, --□-- *M. domesticus*).

Trapping effort for June 1998 totaled 150 trap-nights, and mark-release-recapture resulted in 99 *Mus* and 43 *Leggadina* being captured at least once. Good numbers of *Leggadina* and *Mus* were probably observed as a result of high rainfall earlier in the year.

9. CONCLUSION

Taxonomic assessments of populations of *Leggadina* are completed, and indicate an absence of taxonomic distinction between Thevenard Island, Pilbara and Kimberley populations. Monitoring of island and mainland populations will proceed in 1998/99, including the translocated Serrurier population, given appropriate funding. Field trials of *Mus* control techniques (selective bait stations) may be undertaken, if future large scale control operations are anticipated.

10. REFERENCES

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

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

Moro, D. 1997a. Interactions between native and introduced rodents in an insular environment: strategies for the conservation of the Thevenard Island short-tailed mouse. Unpublished Ph.D. thesis, University of Western Australia, Western Australia, Australia.

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Moro, D., Campbell, N.J.H., Elphinstone, M.S., and Baverstock, P.R. (in press). The Thevenard Island mouse: historic and conservation implications from mitochondrial DNA sequence-variation. *Pacific Conservation Biology*.

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