DRAFT SPECIES CONSERVATION MANAGEMENT PLAN

HEATH MOUSE
(*Pseudomys shortridgei*)

CONSERVATION PLAN FOR THE WHEATBELT POPULATIONS 2009-2014

Heath Mouse (Photo: Babs & Bert Wells / DEC)

Australian Government

Department of Environment and Conservation
Our environment, our future

AVON CATCHMENT COUNCIL

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SECTION 1. BACKGROUND

1.1. HISTORICAL INFORMATION / DISTRIBUTION AND RANGE

The heath mouse was first collected in 1906 by GC Shortridge east of Pingelly, Western Australia (Smith *et al.* 2007). Sub-fossil evidence suggests that before European colonisation the species was present in the south west of Western Australia, as far north as Shark Bay and east to Eucla. Some evidence also suggests their presence across the Nullarbor and the Eyre Peninsula (Baynes 1987). Since its initial discovery in 1906 and the capture of two live individuals in 1931, the heath mouse was not recorded again in Western Australia until its rediscovery in 1987 in the Ravensthorpe area (Baynes *et al.* 1987).

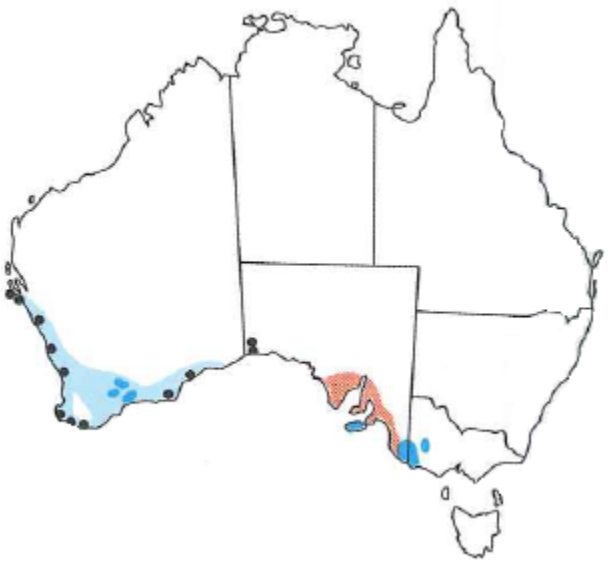

Figure 1: Past and present distribution of *Pseudomys shortridgei*. Red hatching and black dots indicate recent fossil records, light blue indicates distribution at the time of European settlement and dark blue indicates current distribution (Bradley *et al.* 2008).

1.2. SPECIES DESCRIPTION

The heath mouse is small and thickset growing up to 80mm from head to tail and weighing between 55-80g. Its fur is brownish grey, flecked with dark hairs and dark guard hairs, attributing to its fluffy appearance (Smith *et al.* 2007). It is similar in appearance to the common bush rat *Rattus fuscipes* however the heath mouse can be distinguished by its blunt face and hairy tail. The tail is shorter than the combined head-body length and has a distinct bicolouration with darker fur above and pale fur beneath.

1.3. HABITAT AND DISTRIBUTION

Currently the eastern population seems to be restricted to the Grampians and the Wannon region of Victoria and in the Lower Glenelg region across the South Australian border (Menkhorst 1995; Cooper *et al.* 2003). A single specimen was recorded on Kangaroo Island in 1967 however there have been no sightings since. It is proposed that the heath mouse was once continuously distributed along the coast from Shark Bay Western Australia to the current Grampians area (Smith *et al.* 2007). Since 1967 low numbers of heath mice have been recorded in remnant vegetation within the southern Wheatbelt but recent studies suggest it may be restricted to the Lake Magenta Nature Reserve and Fitzgerald River National Park (Smith *et al.* 2007).

Figure 2: Location of the known captures and reports of *Pseudomys shortridgei*, through Avon funded surveys and data collection (red dots) within the Avon NRM Region (blue line). The grey lines denote DEC District and Regional boundaries.

Preferred habitat across both the eastern and western populations seems to be very similar due to their preference for species rich dry heath land. Fire age seems to be distinctly different, with Victorian populations seeming to prefer recently burnt habitat (Cockburn 2000) whilst Western Australian populations seem to prefer long unburnt habitat (Quinlan 2001). Under ground burrows and unburnt shrubs seem to be the most common preferred refuge in Western Australian populations (Cancilla and Johnson 2005).

1.4. BIOLOGY AND ECOLOGY

Evidence suggests heath mice are generalist herbivores, consuming a wide range of plant materiel including seeds, stems, flowers and leaves (Meulman 1997). Most current reproductive information regarding the heath mouse has been determined by research carried out on Victorian populations (Cockburn 2000). These studies indicate that heath mice reach sexual maturity around twelve months with breeding occurring in spring and summer. During the breeding season one or two litters can be produced with up to three young in each litter (Smith *et al.* 2007). Adult heath mice are thought to be territorial and as a result juveniles are forced to disperse into new unoccupied territory once weaned. Studies of captive bred mice in Western Australia have been recorded living up to five years (Smith *et al.* 2007).

1.5. CONSERVATION STATUS

The conservation status of the *Pseudomys shortridgei* is listed under the following legislation:

- Schedule 1 Fauna under the *Wildlife Conservation Act 1950* (WA). (Schedule 1 is defined as fauna that is rare or likely to become extinct and are declared to be fauna that is in need of special protection);
- Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth);
- Endangered in Western Australia where habitat is greatly reduced and secure in Victoria in the 2007 IUCN Red List of Threatened Species (IUCN 2008); and
- 'Insufficiently known' in The Action Plan for Australian Rodents (Lee, 1995).

1.6. THREATENING PROCESSES

There is much evidence to suggest that the heath mouse has suffered major decline in distribution since European settlement. Despite the extensive geographical isolation, the low level of genetic deviation between the east and west populations suggests that both belong to a single species (Cooper *et al.* 2003). Habitat loss due to land clearing for agriculture and human disturbance has led to severely fragmented habitat. As a result of habitat loss the heath mouse is at greater risk of predation from introduced predators such as the red fox *Vulpes vulpes* and the feral cat *Felis catus*, as well as increased exposure to native predators including quolls, pythons, owls and eagles (Menkhorst *et al.* 2006).

Studies to date have shown that the western populations are particularly sensitive to fire. The composition and structure of heath communities are highly influenced by fire regimes. Frequent burns can result in simplified heath under storey which seems unfavourable to the diet and habitat preferences of the heath mouse (Catling 1986).

SECTION 2. ON GROUND ACTIONS UNDERTAKEN AS PART OF BACK FROM THE EDGE

2.1. SURVEYS

Surveys have been undertaken to determine whether the species is restricted to Lake Magenta Nature Reserve within the Avon Catchment and whether the populations at Lake Magenta are secure. As yet, reports of heath mice at other reserves in the Wheatbelt are unconfirmed. There has been one unconfirmed capture approximately 50 km north of Lake Magenta and it is intended that the report be validated if possible.

The populations at Lake Magenta Nature Reserve have been monitored in conjunction with the Science Division of DEC and these populations have been showing fluctuations in numbers in what was thought to be previously stable population. There is a need for a more in-depth survey of Lake Magenta to ensure that the species is not disappearing from the reserve altogether.

2.2. AGRICULTURAL FIELD DAYS

The Newdegate Agricultural Field Day and Wagin Woolorama have been attended annually to increase the audience of 'Back from the Edge' message with posters, stickers, magnets and brochures being displayed and available for members of the public to take. Conservation Officers and the Community Engagement Officer have been available on all occasions to answer any questions asked and develop contacts with local land owners where ever possible.

SECTION 3. FUTURE MANAGEMENT ACTIONS

Specific objective	Performance criteria	Actions
Identify and survey all suitable locations to determine the distribution of the heath mouse in the Avon River Basin.	Identify suitable areas of habitat using satellite imagery and GIS mapping	Produce a map highlighting all potential habitat sites within Avon Catchment
	Assess areas identified to determine potential as Heath Mouse habitat	Create a timeline and program for surveying reserves with suitable habitat for the presence of heath mice
	Survey locations to determine presence of species	Create a database for all records of Heath Mice caught in the Avon River Basin
Review any relevant fire management documentation for managed reserves and parks in the Avon River Basin in relation to conservation of known populations of heath mice and locations for future translocations	Review fire management programs in locations with known populations of Heath Mice	Incorporate conservation of habitat for the Heath Mouse into management plans for reserves containing known populations
		Implement any fire management strategies identified for areas of known heath mice habitat
	Review fire management plans for reserves or parks known to contain significant areas of heath that could potentially support a heath mice population	Prepare a report outlining potential for translocation
Monitor known populations of Heath Mice within the Avon River Basin	Develop and implement a monitoring plan for areas of known heath mice populations	Maintain database with all capture records of Heath Mice in the Avon River Basin
		Produce a current distribution map for the Heath Mouse within the Avon River Basin
	Monitor key areas of habitat and protect habitat from weeds, grazing and the introduction of *Phytophthora cinnamomi*	Incorporate management of heath into broader Regional and District Nature Conservation Strategic plans
Continue research into the ecology and survival requirements of the Heath Mouse to aid further conservation work	Continue research into habitat and resource requirements of the species. Including; diet, availability of resources, impact of fire, re-colonisation of burnt heath, dispersal of young	Further define and identify habitat critical to Heath Mouse survival
		Population Viability Analysis

3.1. MANAGEMENT OF THREATENING PROCESSES

No species specific conservation measures are undertaken at this time by the Department of Environment and Conservation (DEC) for the *P. shortridgei*. However, conservation actions undertaken by DEC throughout the Wheatbelt that impact positively on *Pseudomys* conservation include:

- Habitat Reconstruction using fire, particularly at Lake Magenta Nature Reserve
- Fox baiting under the Western Shield Program, this includes reserves containing populations of *P. shortridgei*

- Research into the Meso-predator phenomenon (the effect of fox baiting of feral cat populations)
- Monitoring of populations on Wheatbelt reserves annually to determine population trends and health
- Reserve management
- Covenants
- Land for Wildlife Program
- Revegetation in targeted landscapes
- Fencing of remnant vegetation on private property in target landscapes

Future management actions that can be undertaken by ACC and DEC include:

- Fire management plans for all reserves containing populations of heath mice, within the Avon, to manage fire in a broad mosaic pattern across the landscape providing areas for the heath mice to colonise during each burn cycle;
- Information pack for those landowners/managers who have remnant heath on their properties – encourage fencing and fire management around the remnant to protect from a single fire event destroying the heath;
- Guidelines for remnant vegetation management – strategies to minimise the impact of feral animals, grazing, rabbit warren ripping, baiting (oats and probait), fencing; and
- Research rates of recolonisation of burnt heath by *P. shortridgei* using a variety of survey techniques including trapping, tracks and other traces and camera monitoring after establishing the presence of populations

SECTION 4. REFERENCES

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