New Holland Mouse

Pseudomys novaehollandiae

TASMANIAN THREATENED FAUNA LISTING STATEMENT

Image: Billie Lazenby

Scientific name: ***Pseudomys novaehollandiae*** **Waterhouse (1843)**

Order/Family: **Rodentia/Muridae**

Common Name: New Holland Mouse

Status:

Threatened Species Protection Act 1995: **Endangered**

Victorian Flora and Fauna Guarantee Act 1988: **Vulnerable**

Environment Protection and Biodiversity Conservation Act 1999: **Not Listed**

IUCN Redlist: **Vulnerable**

Regional Forest Agreement: **Priority Species**

Tasmanian NRM Region: **North and South**

Distribution:

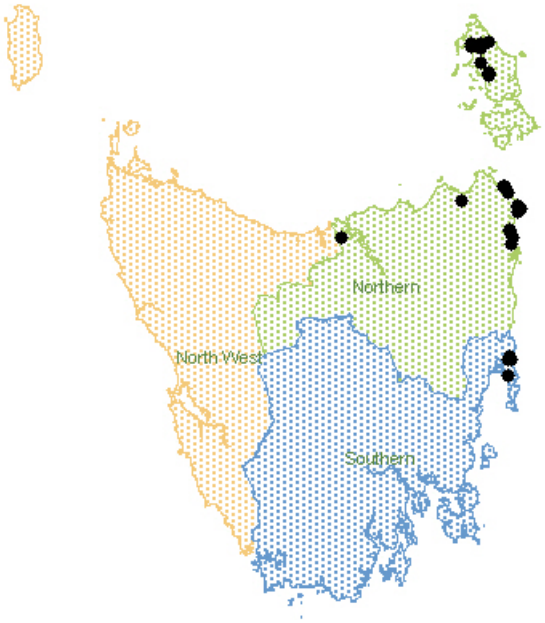

Figure 1. Known locations of *Pseudomys novaehollandiae* in Tasmania

Figure 2. *Pseudomys novaehollandiae* Image: Dave Watts

DESCRIPTION AND ECOLOGY

The New Holland Mouse (*Pseudomys novaehollandiae*) is a small, nocturnal, terrestrial, burrowing native rodent found in disjunct coastal locations on the north and north east of Tasmania, including Flinders Island. The species is also found in Queensland, New South Wales and Victoria.

The species grows to a maximum head and body length of about 90 mm, is grey-brown above and has a dusky brown tail which is 10-15% longer than the rest of the body and darker on the dorsal surface. It has relatively large eyes. These two latter features distinguish it from the house mouse (*Mus musculus*) for which it may be mistaken.

The species is omnivorous, and seeds form one of the main items in the diet. Breeding typically occurs between August and January, and sexual maturity is reached at 13 weeks for females and 20 weeks for males. First year females can produce one litter per season and second year females three or four litters. Litter sizes range from 1-6, averaging 4.6, and young are suckled for 3-4 weeks. Wild females live for up to two years of age. Data on longevity for males is lacking.

DISTRIBUTION AND HABITAT

Following the first documented discovery of *P. novaehollandiae* in Tasmania in 1976, the species has since been found in a number of locations, predominantly on the east coast of the State from Flinders Island to Coles Bay (Table 1). A specimen was collected from Deal Island with hair in cross section that was consistent with *P. novaehollandiae* however a number of external characteristics of this specimen were not consistent with *P. novaehollandiae*. Hair of juvenile Swamp Rats *Rattus lutreolus* can be confused with *P. novaehollandiae*.

Habitat across the species' known range includes open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. On mainland Australia the species has been found to peak in abundance during the early to mid stages of vegetation succession, which is typically 2-3 years post fire. However there may be exceptions to this pattern for *P. novaehollandiae* in Tasmania, as the species has been found in vegetation up to 16 years post-fire. Whether the species would have a much higher abundance if this 16 year old vegetation was 2-3 years post fire is unknown. In light of these observations, fire management planning should take into consideration the successional stage of the vegetation and not just post-fire age.

HISTORICAL DISTRIBUTION

Sub-fossil remains of *P. novaehollandiae* in owl pellets have been identified from three areas in Tasmania: Ranga Caves (Flinders Island), Flowery Gully (near Beaconsfield in northern Tasmania) and Hastings Caves (southern Tasmania). Hastings Caves is well south of the species' currently known distribution in Tasmania.

The national fossil distribution of *P. novaehollandiae* is currently under investigation and preliminary results indicate that the species was much more widespread and abundant prior to European settlement. The observation that *P. novaehollandiae* fossil remains occur in a very wide range of habitats is in contrast to the very specific habitats that the species is now apparently restricted to.

In addition, it is highly likely that the extent of the habitat that *P. novaehollandiae* is now found in has been greatly reduced since European settlement.

RESERVATION STATUS

P. novaehollandiae is reserved in two National Parks (Freycinet NP and Mt William NP) and three Conservation Areas (Coles Bay CA, Bay of Fires CA and Darling Range CA). A large proportion of the known populations and associated habitat occurs in formal reserves on public land (Table 1).

POPULATION ESTIMATE

Unknown

CONSERVATION ASSESSMENT

Pseudomys novaehollandiae meets the criteria for listing as Endangered on the Tasmanian *Threatened Species Protection Act 1995* as the species has an extent of less than 5000 km^2, occupies less than 50 000 hectares, has a severely fragmented distribution, with evidence of extreme fluctuations in populations and a continuing decline.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

THREATS

Currently recognised threats to the species are listed below in no order of priority. Threats are likely to be interrelated.

- Habitat loss and modification. The single largest contributing factor to habitat loss and modification is likely to be lack of appropriate fire regimes. Most currently known populations of *P. novaehollandiae* are found within reserves, however the species has been very poorly surveyed, and habitat modelling indicates the presence of *P. novaehollandiae* habitat outside of reserves. Causes of habitat loss additional to inappropriate fire regimes include coastal development and conversion to forest plantation, and conversion to pasture. An important cause of habitat modification is infection of *P. novaehollandiae* habitat with root rot fungus *Phytophthora cinnamomi.*
- Predation from generalist introduced predators such as the cat and fox. This might be one explanation for the apparent reduction in habitat range of *P. novaehollandiae* since European settlement.
- Fragmented populations are more vulnerable to local extinction through stochastic risk.
- Rainfall has been shown to affect the length of the breeding season for *P. novaehollandiae;* therefore reduced rainfall as a result of climate change may be a significant threat to the species.

LIMITING FACTORS

Factors that limit the effective management of the conservation status of *P. novaehollandiae* are generally associated with a lack of knowledge of the species' ecology, distribution and abundance. Limiting factors include:

- current distribution of *P. novaehollandiae* within Tasmania is unknown;
- lack of appropriate fire management planning;
- lack of understanding of the magnitude of threats to the species including the impact of the cat and fox;
- lack of understanding of the causal factors underlying the species apparently specific habitat requirements including the effect of potential competition with the introduced house mouse, *Mus musculus*;
- the need for an assessment of the effectiveness of different monitoring methods in order to understand the probability of detecting the species and therefore interpret apparent 'negative' detection results;
- lack of understanding of the short and long term impacts of variations in rainfall on the population viability of *P. novaehollandiae.*

MANAGEMENT ISSUES

It is important that potential and known *P. novaehollandiae* habitat is managed as the uncertainty in detecting *P. novaehollandiae* may result in false negative records. Moreover *P. novaehollandiae* distribution is patchy in time and space, given the species' reliance on early to mid-stage successional vegetation. Therefore *P. novaehollandiae* habitat should be managed to include the entire range of vegetation succession stages in order for effective long term conservation of habitat.

MANAGEMENT STRATEGY

WHAT HAS BEEN DONE?

A draft multi-species recovery plan has been prepared for the Freycinet region, which includes actions for *P. novaehollandiae.*

Studies have been undertaken to qualitatively and quantitatively describe *P. novaehollandiae*

habitat in Tasmania, diet, and basic life history parameters (see bibliography).

WHAT IS NEEDED?

Increased understanding of the distribution, threats, reasons for the apparent specific habitat requirements, probability of detection, and the effects of changes in rainfall on *P. novaehollandiae.*

Actions necessary to decrease the extinction risk to *P. novaehollandiae* include:

- conduct surveys to determine the current distribution of *P. novaehollandiae* in Tasmania including a broad range of habitat types and starting with priority areas such as the Dazzler Range which is the most western record for the species in the State and which has not been confirmed for over 30 years ;
- protect and actively manage known sites by adopting appropriate fire regimes and cat control;
- adopt appropriate burning regimes in potential *P. novaehollandiae* habitat in order to maximise the distribution of the species in Tasmania;
- gain more information about the ecology, distribution, abundance and threats to *P. novaehollandiae* to better prioritise management resources;
- eradicate foxes from Tasmania and prevent any reintroductions by employing appropriate quarantine measures;
- develop a tiered system of habitat management where known sites are managed to the highest level and potential sites are managed at a secondary level.
- protect habitat in and immediately around known localities which includes ensuring that pre-development surveys are undertaken using the co-occurence of indicator plant species as cues for potential habitat (indicator plant species are *Aotus ericoides, Hypolaena fastigiata, Lepidosperma concavum* and *Xanthorrhoea spp.*); and
- develop a clear working definition of potential *P. novaehollandiae* habitat.

ADVICE FOR LANDOWNERS/MANAGERS

The following actions will assist to conserve *P. novaehollandiae* in Tasmania.

- Protect dry heathlands, woodlands with a heathland understorey and vegetated sand dunes within 50 kilometres of the coast. Avoid disturbance, grazing and burning too little or too often. Seek specialist advice and develop a fire management plan for your property.
- Learn to recognise *P. novaehollandiae* habitat and to distinguish *P. novaehollandiae* from the introduced house mouse *Mus musculus*.
- Encourage specialists to conduct surveys for *P. novaehollandiae* to improve our knowledge of the distribution and ecological requirements for the species.
- Practice responsible pet ownership. Desex and microchip pet cats and reduce their hunting impact by keeping them indoors at night.

BIBLIOGRAPHY

Bryant, S. L., and Jackson, J. (1999) *Tasmania's Threatened Fauna Handbook: What, Where and How to Protect Tasmania's Threatened Animals*. Threatened Species Unit, Parks and Wildlife Service, Hobart.

Hocking, G.J. (1980) The occurrence of the New Holland Mouse, *Pseudomys novaehollandiae* (Waterhouse), in Tasmania. *Australian Wildlife Research*: **7**, 71-77.

Lazenby, B., Pye, T., Richardson, A., and Bryant, S. (2007) Towards a habitat model for the New Holland Mouse *Pseudomys novaehollandiae* in Tasmania – population vegetation associations and an investigation into individual habitat use. *Australian Mammalogy*, **29**: 137-148.

Norton, T. W. (1987) The ecology of small mammals in north-eastern Tasmania II. *Pseudomys novaehollandiae* and the introduced *Mus musculus*. *Australian Wildlife Research*: **14**: 435-441.

Pye, T. (1991) The New Holland Mouse (*Pseudomys novaehollandiae*) (Rodentia: Muridae) in Tasmania: a field study. *Wildlife Research* **18**: 521-531.

Seebeck J., Menkhorst, P., Wilson, B., Lowe, K.W. (1996) Flora and Fauna Guarantee Action Statement No. 74. Victorian Department of Sustainability and Environment.

Threatened Species Section (2008). Draft Greater Freycinet Region Threatened Species Recovery Plan 2008-2012. DPIW, Hobart.

SPECIALIST ADVICE

- Billie Lazenby, DPIPWE.

Prepared by: Billie Lazenby, November 2009.

Review Date: When new information received.

Cite as: Threatened Species Section 2008 Listing Statement New Holland Mouse *Pseudomys novaehollandiae*, Department of Primary Industries and Water.

View: http://www.dpiwe.tas.gov.au and follow the links to Native Plants and Animals, Threatened Species, then Threatened Species Lists.

Contact details: Threatened Species Section, Department of Primary Industries, Water and Environment, GPO Box 44 Hobart Tasmania Australia 7001. Ph (03) 6233 6556 fax (03) 6233 3477.

Permit: It is an offence to collect, disturb, damage or destroy this species unless under permit.

Table 1 – Known population details of *Pseudomys novaehollandiae* in Tasmania. Table is taken from the Threatened Species Section (2008). Draft Greater Freycinet Region Threatened Species Recovery Plan 2008-2012. DPIW, Hobart.

	Location Tenure	**NRM region/ LGA** **Bioregion**	**1:25 000 mapsheet and number**	**Year last observed**	**Size of population**
1	**Hepburn Point, Coles Bay** Conservation Area	S/GSB Southeast	Coles Bay 6033	2001	Unknown 43 trapped in 790 trap nights
2	**Friendly Beaches West** Private Land	S/GSB Southeast	Friendly 6034	1976	Unknown
3	**Friendly Beaches East** National Park	S/GSB Southeast	Friendly 6034	1976	Unknown
4	**Friendly Beaches North** Private Land	S/GSB Southeast	Lodi 6035	1976	Unknown 4 trapped in 150 trap nights
5	**Bay of Fires South** State Reserve	N/BOD Flinders	Binalong 6043	1979	Unknown
6	**Bay of Fires** Conservation Area	N/BOD Flinders	The Gardens 6044	1976	Unknown 3 trapped in 150 trap nights
7	**Bay of Fires North** Conservation Area	N/BOD Flinders	The Gardens 6044	1982	Unknown
8	**Mt William South** National Park	N/BOD Flinders	Ansons Bay 6045	1999	Unknown 7 trapped in 560 trap nights
9	**Mt William** National Park	N/BOD Flinders	Eddystone 4046	2002	Unknown
10	**Mt William North** National Park	N/D Flinders	Naturaliste 6047	2004	Unknown 1 trapped in 50 trap nights
11	**Dazzler Range** State Forest	N/WT Northern Slopes	Harford 4643	1970	Unknown
12	**Boobyalla River** Private Land	N/D Flinders	Monarch 5646	1986	Unknown
13	**Darling Range, Flinders Island** Conservation Area	N/FI Flinders	Lventhorpe 5856	1986	Unknown
14	**Memana, Flinders Island** Private Land	N/FI Flinders	Memana 5857	1986	Unknown
15	**Wingaroo West, Flinders Island** Nature Reserve/Private land	N/FI Flinders	Tanner 5658	1992	Unknown
16	**Wingaroo North, Flinders Island** Nature Reserve	N/FI Flinders	Arthurs	1999	Unknown 2 trapped in 490 trap nights

(NRM = Natural Resource Management: S = Southern NRM region, N = Northern NRM region; LGA = Local Government Area: GSB = Glamorgan/Spring Bay Council, B = Break O'Day Council, D = Dorset Council, FI = Flinders Island Council, WT = West Tamar Council; Year last observed = year in which the population was last observed if population size is not recorded or year of last population survey where the number of mature plants is recorded; Habitat area = area of occupancy.)