

Approved Conservation Advice for
***Pseudomys novaehollandiae* (New Holland Mouse)**
(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing plans, records or management prescriptions for this species.

Description

Pseudomys novaehollandiae, Family Muridae, also known as the New Holland Mouse, is a small, burrowing native rodent. The New Holland Mouse is similar in size and appearance to the introduced house mouse (*Mus musculus*), although it can be distinguished by its slightly larger ears and eyes, the absence of a notch on the upper incisors and the absence of a distinctive ‘mousy’ odour. The species is grey-brown in colour and its dusky-brown tail is darker on the dorsal side. The species has a head-body length of approximately 65-90 mm, a tail length of approximately 80-105 mm and a hind foot length of approximately 20-22 mm (Menkhorst and Knight, 2001). Specimens of the New Holland Mouse from Tasmania are larger in weight than specimens from NSW and Victoria, however head-body length and skull measurements are similar between the Tasmanian and mainland forms of the species (Hocking 1980, Lazenby, 1999).

Conservation Status

The New Holland Mouse is listed as vulnerable. This species is eligible for listing as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) as the species’ geographic distribution is precarious for its survival and the estimated total number of mature individuals is limited and is likely to continue to decline (TSSC, 2009).

The species is also listed as Endangered under the *Tasmanian Threatened Species Protection Act 1995*, and listed as Endangered under the *Victorian Flora and Fauna Guarantee Act 1988*. The species is listed as Secure under the *NSW Threatened Species Conservation Act 1995* and listed as Least Concern under the *Queensland Nature Conservation Act 1992*.

Distribution and Habitat

The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. In 2006 there were known to be 6 - 8 metapopulations of the species (NSW Atlas of Wildlife, VIC Atlas of Wildlife, TAS Natural Values Atlas). Across the species’ range, the total population size of mature individuals estimated to be less than 10,000 individuals (Menkhorst et al., 2008). A high percentage of the known New Holland Mouse populations have not been surveyed between 1999 and 2009 and therefore the species’ actual distribution may be smaller or larger than current estimates. However, given the number of sites from which the species is known to have disappeared between 1999 and 2009, it is likely that the species’ distribution is actually smaller than current estimates. Including sites in which the species has not been confirmed between 1999 and 2009, the estimated extent of occurrence of the New Holland Mouse is estimated to be around 108,000 km² and the area of occupancy is estimated to be around 680 km². However, including only sites from which the species has been confirmed between 1999 and 2009, the current extent of occurrence is estimated to be around 90,000 km² and the species’ area of occupancy is estimated to be around 420 km².

Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes (Keith and Calaby, 1968; Posamentier and Recher, 1974; Fox and Fox, 1978; Hocking, 1980; Fox and Mckay, 1981; Norton, 1987; Pye, 1991; Wilson, 1991; Lazenby et al., 2008). The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals (Kemper, 1980; Lazenby et al., 2008). The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha (Lazenby et al., 2008; Lazenby, 1999). The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire (Posamentier and Recher, 1974; Braithwaite and Gullan, 1978; Fox and Fox, 1978; Fox and Mckay, 1981).

Threats

Loss and modification of habitat due to land development, weed invasion and *Phytophthora*, is a threat to the New Holland Mouse (Seebeck et al., 1996). Inappropriate fire management is also a threat to the species (Seebeck and Menkhorst, 2000).

Predation by introduced predators, including the red fox (*Vulpes vulpes*), cat (*Felis catus*) and dog (*Canis familiaris*) is a threat to the New Holland Mouse (Seebeck et al., 1996; Smith and Quin, 1996; Ford, 2003) and competition from introduced rodents, such as the house mouse is a potential threat (Fox and Gullick, 1989; Seebeck et al., 1996).

Climate change has been identified as a potential threat to the New Holland Mouse through alteration and further fragmentation of the species' habitat. Brereton et al. (2005) modelled the impact of a number of potential climate change scenarios on the distribution of a range of small mammals, including the New Holland Mouse, and concluded that future climate change could result in a decline of up to 50% in the distribution of the species.

Overall, the threats listed above are likely to be synergistic. For example, a disturbance event such as a fire may allow for easier hunting opportunities for introduced predators.

Research Priorities

Research priorities that would inform future regional and local priority actions include:

- More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.
- Design and implement a monitoring program or, if appropriate, support and enhance existing programs.
- More precisely assess what fire regimes maintain suitable successional age, size and distribution of habitat required by the species.
- Consider establishing possible captive breeding programs and re-introductions of the species into suitable areas of habitat, where appropriate.
- Undertake survey work to investigate whether there are additional populations and to locate additional patches of suitable habitat.
- Undertake further research to assess the impact of climate change / rainfall variability on New Holland Mouse abundance and New Holland Mouse habitat e.g. food availability.
- Clarify the role of other rodents (both native and introduced) in the population ecology / disease status / conservation status of the New Holland Mouse.
- Undertake research to better understand the species' metapopulation dynamics and causes of fragmentation in the species' distribution.

Priority Actions

The following regional priority recovery and threat abatement actions can be done to support the recovery of the New Holland Mouse.

Regional Planning Approach

- Consider appropriate landscape scale management strategies that take into account appropriate fire regimes, management of predator / prey relationships and the enhancement of landscape function through connectivity, water balance and other related ecological drivers.
- Regional planning to maintain connectivity

Habitat Loss, Disturbance and Modification

- Monitor known populations to identify key threats.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Ensure that fire management is undertaken so that populations have access to appropriate age classes of vegetation and areas of suitable habitat.
- Identify populations of high conservation priority.
- Ensure there is no disturbance in areas where the New Holland Mouse occurs, excluding necessary actions to manage the conservation of the species.
- Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible to halt the removal and fragmentation of suitable habitat.
- Control access routes to suitably constrain public access to known sites on public land.
- Suitably control and manage access on private land and other land tenure.
- Manage total grazing pressure in areas known to be utilised by the species
- Consider acquisition of private or leasehold land containing populations of the New Holland Mouse.
- Minimise adverse impacts from land use at known sites.

Invasive Weeds

- Identify and remove weeds which could become a threat to the New Holland Mouse, using appropriate methods.
- Manage sites to prevent introduction of invasive weeds, which could become a threat to the New Holland Mouse, using appropriate methods.
- Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the New Holland Mouse.

Animal Predation or Competition

- Implement actions outlined in the Threat Abatement Plan for Predation by Feral Cats and the Threat Abatement Plan for Predation by European red fox for the control and eradication of feral cats and red foxes in areas where the species occurs.

Fire

- Identify appropriate intensity and interval of fire to create patches of habitat of different successions for the New Holland Mouse.
- Implement suitable fire management strategies for the habitat of the New Holland Mouse.
- Where appropriate provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigative measures in bush fire risk management plan(s), risk register and/or operation maps.

Diseases, Fungi and Parasites

- Develop and implement suitable hygiene protocols to protect known sites from further outbreaks of dieback caused by *Phytophthora cinnamomi*.
- Implement appropriate management actions to minimise the adverse impacts of existing *Phytophthora cinnamomi* infestations

Conservation Information

- Raise awareness of the New Holland Mouse within the local community through fact sheets/information brochures / field days in conjunction with known industry or community interest groups.
- Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.

This list does not necessarily encompass all actions that may be of benefit to the New Holland Mouse, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

Existing Plans/Management Prescriptions that are Relevant to the Species

- Draft Flora and Fauna Guarantee Action Statement - New Holland Mouse *Pseudomys novaehollandiae* (DSE, 2009)
- Flora and Fauna Guarantee Action Statement No. 74, New Holland Mouse *Pseudomys novaehollandiae* (DNRE, 1996)
- Living with Fire – Victoria's Bushfire Strategy (DSE, 2008)
- Threat Abatement Plan for Predation by Feral Cats (DEWHA, 2008)
- Threat Abatement Plan for Predation by European red fox (DEWHA 2008)
- Threat Abatement Plan for Disease in Natural Ecosystems caused by *Phytophthora cinnamomi* (DEWHA, 2009)

These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.

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