

Concept Plan SP 2021-046

Distribution and conservation status of the heath mouse (*Pseudomys shortridgei*) in Western Australia

Animal Science

Project Core Team

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New project, pending concept plan approval

Document endorsements and approvals as of June 13, 2022, 11:21 a.m.

Project Team

granted

Program Leader

granted

Directorate

required

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Program

Animal Science

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Background

The heath mouse *Pseudomys shortridgei* (50-80g) is one of several native rodent species that have declined in distribution and abundance since European colonisation. According to subfossil records, the species was once widely distributed across the heathlands of Western Australia, South Australia and Victoria. It now occurs in species-rich and structurally complex heathland and woodland in two disjunct areas in south-western Victoria/eastern South Australia and in southern Western Australia (WA). The main ecological difference between these two separate meta-populations appears to be related to fire regime. In WA, the species is known from long unburnt habitat with highest densities recorded in vegetation 30 years post-fire. Whereas in Victoria, highest densities have been recorded in habitat 5-15 years after fire. While there is disparity in two studies investigating their genetic differentiation, they are currently treated as a single species.

Originally collected in 1906 near Pingelly in WA's wheatbelt, the heath mouse was thought to be extinct in WA until its rediscovery in 1987. Since then, it has been detected in low numbers within the Fitzgerald River National Park, Dragon Rocks Nature Reserve, Ravensthorpe Range (and nearby) and Lake Magenta Nature Reserve. Until 2019, the last confirmed record of the heath mouse in WA was in 2004, from Lake Magenta. The heath mouse is listed as Endangered under the EPBC Act and Vulnerable under the WA *Biodiversity Conservation Act*.

The lack of recent heath mouse records in WA instigated targeted surveys for this species in May/June 2019, which resulted in their capture at two locations: one south of Ravensthorpe (Unallocated Crown Land Block 1040) and the second in the Great Western Woodlands 80km southeast of Hyden near Diggers Rock. This preliminary survey provided evidence that the heath mouse was still extant in WA, but further surveys in 2020 failed to detect the species despite sampling in areas where they had previously been recorded (i.e., Lake Magenta Nature Reserve, Fitzgerald River National Park and the Ravensthorpe Range area). In general, trap success across all sights was remarkably low, and was thought to be due to successive years of below average rainfall across the area.

Although not previously thought to be a boom/bust species, studies in the Grampians National Park in Victoria have shown a strong correlation between heath mouse abundance and rainfall. Abundance peaked following high rainfall events and fell to very low densities during drought conditions. This is also likely to be the case in WA, although the lack of long-term monitoring data makes this difficult to discern.

As there is no recovery plan for the heath mouse, and yet there is evidence of a significant decline in their distribution and abundance, further targeted survey is critical to determine their current conservation status. Given the low density and patchy distribution of the heath mouse, developing a survey strategy that maximises the likelihood of detecting the species poses a challenge. Habitat suitability models based on historical records and relevant environmental data layers can assist, but given the species appears to be now absent in many of the areas where it was historically recorded, the reliability of such static models is questionable. As annual rainfall has declined in south-west WA, and is predicted to decline further, projecting these models onto future climate scenarios may be useful for selecting survey locations in areas previously thought to be unsuitable.

Should populations of the heath mouse be detected, a decision then needs to be made in terms of what management actions are required to protect the species and promote its recovery. In-situ actions alone may not be adequate if their abundance is determined to be critically low. In this case, establishing a captive breeding program may be an option, with the goal to produce enough founders for reintroductions.

Aims

We propose to undertake targeted surveys for the heath mouse to a) establish their current range and conservation status in WA, b) identify populations that may be suitable for ongoing monitoring, and c) to assess the

possibility of sourcing heath mice for a captive breeding colony to provide founders for reintroductions. We will develop habitat suitability models projected onto future climate scenarios, combined with other information, to help identify survey locations. We will also use a structured decision-making process, based on the Planning and Assessment for Conservation through Ex-Situ management (PACES) tool, to assist with decisions in relation to in-situ and ex-situ management actions.

Expected outcome

- An improved understanding of the distribution and abundance of heath mice to inform effective conservation management and recovery actions.
- Identification of conservation management actions, including captive breeding and potential translocations, to establish sustainable populations of heath mice in the wild.

Strategic context

Contributes to the following BCS strategic goals and key deliverables of the Animal Science Program Plan including:

- Recommendations regarding conservation actions necessary to maintain sustainable populations, or recovery of, targeted species including the management of threatening processes; recommendations regarding the conservation status of targeted species; purpose-specific optimal monitoring strategies; best practice guidelines that maximise translocation success.
- Recommended strategies to enhance the resilience of native fauna to habitat disturbance.
- Effective engagement among all staff to ensure science supports the department's conservation and management functions.

Additionally, the heath mouse is one of the species listed for reintroduction to Dirk Hartog Island. Establishment of a secure population on DHI would help to reduce its risk of extinction. Captive breeding will most likely be required to provide sufficient founders, and information on potential source populations is required.

Expected collaborations

BCS (Animal Science Program, Species and Communities, and Perth Zoo) and RFMS (South Coast and Wheatbelt Regions), environmental consultants, UWA (Albany)

Proposed period of the project

Sept. 1, 2021 – Sept. 1, 2024

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.2	0.2	0.2
Technical	0.2	0.2	0.2
Volunteer	0.1	0.1	0.1
Collaborator	0.2	0.2	0.1

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	40,000	40,000	20,000
External Funding	5,000	5,000	5,000