Action statement

Flora & Fauna Guarantee Act 1988

New Holland Mouse (Pookila) *(Pseudomys novaehollandiae)*

Taxon ID: 11455

Action statements are developed under the *Flora and Fauna Guarantee Act 1988* (FFG Act). Their preparation and implementation complement the FFG Act strategy *Protecting Victoria's Environment – Biodiversity 2037* and its vision that "Victoria's biodiversity is healthy, valued and actively cared for".

Species and Distribution

Pookila. Image from Museums Victoria

This habitat distribution model displays the indicative range of the Pookila based on occurrence records and likely habitat. See NatureKit for an interactive map. The Pookila also occurs outside of Victoria.

Conservation Status

Endangered

Listing criteria: 4.1.2(a), (b)(ii),(iii),(iv),(v); 4.1.3(b)(i) of the Flora and Fauna Guarantee Regulations 2020.

This means that:

- the Pookila's geographic distribution is highly restricted; and
- the distribution of the population or habitat is severely fragmented; and
- it is restricted to a limited number of areas that are subject to the same threat or suite of threats that can impact all individuals present; and
- there is a continuing decline or reduction in:
  - its area of occupancy; and
  - the area, extent or quality of habitat; and
  - the number of locations or subpopulations; and
  - the number of mature individuals; and

- the total number of mature individuals is low, the number is likely to continue to decline and each subpopulation is very small.

Corresponding International Union for the Conservation of Nature (IUCN) criteria: B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v); C2a(i). More information on IUCN listing criteria can be found here: IUCN Red List criteria.

Species Information

Species information such as its description, distribution, ecology and references are provided in the New Holland Mouse (Pookila) Species Forecast Report.

Threats

Threats listed below have been identified through expert consultation, published literature and spatial analysis.

Threat	Description
Habitat loss, degradation or modification	
Vegetation clearing or damage	• Loss, modification and fragmentation of habitat due to land use change and development.
Fire	
Altered fire regimes	• Inappropriate fire regimes may have severe consequences across the entire distribution. Long-term exclusion of fire from some locations (e.g., Wilsons Promontory) has contributed to changes in vegetation succession and Coast Tea-tree (*Leptospermum laevigatum*) encroachment, causing loss of suitable habitat. • Too frequent fire can cause loss of suitable floristic and structural habitat. Fire (including planned burns) at high intensity or during periods of drought can cause long-term changes to habitat. • The immediate effects of fire are removal of habitat features, potential mortality, and impacts to food availability. • Following fire, predation may increase, as fire reduces cover, fragments habitat and increases access for predators. Some predators travel to and target areas post-fire increasing the number of predators and threat of predation. • A hotter, drier climate may increase the likelihood or frequency of fire impacting Pookila habitat, with the potential to cause direct mortality, and reduce habitat quality and/or extent.
Climate change	
Increased frequency and/or length of droughts	• Fluctuations in rainfall patterns and a higher frequency of drought impact Pookila population density, possibly resulting in population crashes. Rainfall patterns affect the survival of adults and juveniles, timing of breeding, and population abundance. Through changes in rainfall patterns, climate change may impact reproduction and fecundity.
Temperature extremes	• Extreme heat events may lead to direct adult mortality and loss of pregnancies andjuveniles.

Threat	Description
Introduced species	
Introduced herbivores	• Overgrazing and selective grazing by invasive herbivores such as deer species and rabbits *(Oryctolagus cuniculus*) contribute to habitat alteration and degradation, especially post-fire where this facilitates Coast Tea-tree encroachment.
Introduced plants	• Introduced plants change the structure and composition of foraging habitats, degrading habitat, and may reduce food availability.
Introduced predators	• Predation by feral cats (*Felis catus*) and foxes (*Vulpes vulpes*) are assumed tooccur. Possible predation by Black Rat (*Rattus rattus*).
Pest animals	• Competition from introduced rodents, such as the House Mouse (*Mus musculus*) may reduce food availability for the Pookila. This likely only occurs when mouse numbers are very high.
Native species	
Mammals	• Over-grazing by native herbivores, particularly wombats, at Wilsons Promontory National Park can suppress the grassland structure necessary for the Pookila.
Problematic native plants	• Coast Tea-tree encroachment at Wilsons Promontory National Park has caused significant habitat loss by degrading and reducing heath and grassland habitats necessary for the Pookila. Encroachment is facilitated by past stock grazing creating bare ground for germination, combined with inappropriate fire regimes (notably timing, especially in relation to seed set).
Population dynamics	
Genetic decline	• Pookila populations have lost genetic diversity and are at risk of inbreeding depression. Populations are currently exhibiting low genetic diversity which can affect health, fecundity and resilience to a changing climate. Seven of the twelve known populations of Pookila in Victoria are now extinct, resulting in significant loss of genetic diversity at the state scale.
Pathogens and disease	
Disease (other)	• The potential of novel disease carried by invasive rodents poses a risk to Pookila populations, which may have reduced resilience due to genetic decline.
Phytopthora cinnamomi	• *Phytopthora cinnamomi* causes loss of suitable Pookila floristic and structural habitat.
Toxoplasmosis	• *Toxoplasma gondii* in cats and invasive rodents can be spread to Pookila and result in direct mortality.
Human disturbance	
Illegal take	• Illegal firewood collection can impact the quality of Pookila habitat by trampling and damage from vehicles and trailers.
Incidental impacts from baiting/trapping	• Pindone oat and 1080 carrot baits from rabbit baiting programs can lead to direct mortality of Pookila and population loss.

Threat	Description
Recreational activities	• Illegal off-road and track trail bike use can cause vegetation and soil damage impacting the quality of Pookila habitat, cause direct mortality, and may impact the species' movement across habitat

Conservation Objectives

Conservation objectives are informed by the conservation status and criteria under which the species was listed under the FFG Act. This provides a framework to understand how we can work towards recovery and improve the species' conservation status over time as per the objectives of the FFG Act.

The key objectives of this action statement are:

- Mitigate threats to populations and habitat to increase resilience, improve genetic fitness and minimise future population decline.
- Increase the wild population size to at least 250 mature individuals in each subpopulation.
- Increase knowledge of biology, ecology, distribution, demography, emerging threats, and conservation requirements.
- Support community participation and improve awareness of the Pookila and conservation of its habitat.

Conservation Actions

The actions below have been identified through expert consultation, published literature and spatial analysis. Actions are listed in alphabetical order to allow all interested parties to prioritise based on their context, capacity and capability. Landscape scale actions may mitigate threats for other species. For more information on where to undertake actions that benefit multiple species and identify the most beneficial locations to undertake actions for this species, please refer to NatureKit.

Action	Description
Build resilience by translocation / gene mixing	• Undertake appropriate translocations between wild populations and ex-situ breeding individuals, to maintain and improve genetic diversity.
Community engagement and awareness	• Identify, promote and support opportunities for community education and involvement in conservation efforts for the species.
Compliance and enforcement	• Undertake compliance and enforcement activities to limit the impacts of illegal firewood collection and off-road trail bike use to the species.
Control introduced animals*	• Implement effective control of introduced rodents when occurring in sufficient numbers to compete with the Pookila, such as the House Mouse and the Black Rat.
Control introduced herbivores*	• Implement effective management and control of introduced herbivores across all populations including Hog Deer, Sambar Deer and rabbits.
Control introduced plants*	• Implement effective management and control of introduced plants and undertake revegetation with appropriate native species.
Control introduced predators*	• Implement effective control of feral cats and foxes across all key Pookila sites (Gippsland Lakes Coastal Park including Dutson Downs, The Lakes National Park, Wilsons Promontory National Park, Providence Ponds) and where the Pookila occurs on covenanted land and private property.

Action	Description
Develop, update and apply forestry protections	• Maintain prescriptions for this species under the *Code of Practice for Timber Production 2014 (as amended in 2022)* (the Code). • Where relevant, incorporate species-specific protection measures into plans and permits relating to timber harvesting operations in native forest on private land.
Ecological fire regime	• Implement fire management actions that promote an ecologically appropriate fire regime for the Pookila.
Ex-situ management	• Maintain and continue to improve the existing Victorian Pookila Conservation Breeding Program to provide insurance against extinction, support genetic rescue and provide genetically suitable animals for reintroduction. • Establish a semi-wild insurance population at Cranbourne Botanic Gardens (within a predator-proof area or reserve).
Habitat restoration and/or revegetation*	• Restore connections between fragmented habitats.
Manage impacts from natural disaster events	• Following significant drought and bushfire events, manage the impact of increased predation pressure on the Pookila until vegetation cover regenerates and habitat becomes less fragmented. • Implement other site-specific actions such as artificial cover, supplementary food and water points, and rescue and release, as required. Assess and address the likely impacts from any fragmentation of habitat that results from such events.
Manage Phytophthora	• Management of impacts and prevention of further spread of *Phytopthora cinnamomi* in Pookila habitat.
Manage problematic native plants	• Manage problematic native species such as Coast Tea-tree in Pookila habitat.
Research	• Undertake research into impacts and management requirements of invasive fauna and pathogens. • Identify key habitat and management requirements across the species' range, including key habitat attributes such as flora and structure, and analysis of projected impacts to these under climate change. • Investigate and determine a suitable fire regime that meets the ecological requirements of the Pookila and promotes its recovery. • Continue to research gene-mixing and genetic rescue within the ex-situ and wild populations. • Continue to refine captive husbandry, diet and reintroduction requirements. • Continue research into cryopreservation of live tissue, and reinstatement of lost genetic diversity from existing cryopreserved samples.
Survey and monitoring	• Continue ongoing monitoring programs including collaboration and adaptive management across jurisdictions.

**Indicates landscape-scale actions that may deliver benefits to multiple species*

Past Actions

The key conservation management actions listed below have been delivered in the past 10 years.

Past action	Description
Community engagement and awareness	• Education outreach undertaken through Zoos Victoria's Fighting Extinction Schools and 'Love your Locals' programs. Pookila information, badges, swap cards and temporary tattoos have contributed to awareness raising for the Victorian community. • Social and mainstream media stories have assisted in raising wider awareness of the species.
Conservation management planning	• Both Victorian and national Pookila forums have been held, resulting in the formation of the National Pookila Recovery Team, Victorian Working Group, identification of research gaps, conservation priorities and draft vegetation monitoring methodology.
Control introduced predators	• A survey of feral cat and fox populations using remote cameras at Providence Ponds was undertaken, and a Pest Animal Control Strategy developed. • Introduced predators were controlled at various locations where the Pookila is present. Regular fox baiting program at Dutson Downs has occurred. • Fox control over three years at Providence Ponds Flora and Fauna Reserve, Gippsland Lakes Coastal Park and nearby covenanted property was completed in 2020.
Develop, update, and apply forestry protections	• The species has a current species-specific prescription in the Code: – In the Gippsland Forest Management Areas: Apply a protection area of 100 ha of preferred habitat including the detection site wherever possible. • The risk of forestry operations was assessed for this species in 2020 under the Victorian Government Threatened Species and Communities Risk Assessment. Additional permanent protections were not found to be required.
Ecological fire regime	• Ecological burning has been undertaken at selected known and potential Pookila habitat.
Ex-situ management	• Captive breeding program commenced in 2022 by Zoos Victoria, including works to establish a semi-wild population at Cranbourne Botanic Gardens. Breeding mice housed in biosecure facilities at Melbourne Zoo and Moonlit Sanctuary. • Refinement of captive husbandry techniques, diets and management undertaken, with a studbook managed by Zoos Victoria. • A Captive Breeding Sub-group was formed in 2022 as part of the National Pookila Recovery Team.
Manage problematic native plants	• Coast Tea-tree was treated using fire at Yanakie Isthmus where encroaching on Pookila habitat.
Recovery Plan	• A National Pookila Recovery Plan has been prepared and is in review at time of publication.
Research	• Habitat assessments have been undertaken to more accurately determine Pookila habitat requirements.

Past action	Description
	• Ongoing adaptive management trials are underway at Wilsons Promontory National Park to recover Banksia grassy woodlands (a key element of Pookila habitat). • Reassessment of Pookila status across Victoria including extensive survey effort across historic sites and modelled suitable habitat has been undertaken. • Thorough genetic assessment across its national range including implementation of recommendations for genetic recovery actions. • Vegetation assessments on vegetation structure, cover, abundance, and species in relation to Pookila presence/absence have been undertaken to determine an appropriate fire regime for the species and its habitat.
Survey and monitoring	• Annual population monitoring has been undertaken across extant populations using remote cameras has since 2017, and live capture for population health monitoring and collection of genetic samples since 2015. • Live capture and genetic analysis for population health monitoring across all extant populations has been undertaken since 2019. • Monitoring in conjunction with fox control over a three-year period was undertaken at Providence Ponds Flora and Fauna Reserve and Gippsland Lakes Coastal Park, completed in 2020. • Surveys have been undertaken to determine the current distribution and possible presence of the Pookila in various locations through live and camera trapping (Mullungdung State Forest, Providence Ponds, Wilsons Promontory, covenanted sites and Trust for Nature reserves on the Gippsland Plains). • Surveys at Anglesea Heathland have been undertaken over the past decade, including sites where previously recorded, yielded no detections in the area. • A small mammal survey was conducted in burnt areas of Wilsons Promontory National Park after planned burns. • Monitoring of Pookila has been undertaken in association with ecological burning to determine impacts of fire regimes.

Decision Support Tools

Decision making for conservation actions is supported through the following Victorian Government tools which may be of assistance in choosing the most appropriate or beneficial actions for biodiversity:

- Choosing actions for nature: NatureKit
- Biodiversity Knowledge Framework

Further Information

- New Holland Mouse (Pookila) Species Forecast Report
- Threatened Species Assessment report – New Holland Mouse (Pookila) (*Pseudomys novaehollandiae*)
- Commonwealth Species Profile and Threats database
- Threatened Species and Communities Risk Assessment
- Victoria's changing climate – understanding the impacts of climate change on Victoria
- Code of Practice for Timber Production 2014
- Genetic Risk Index

- Commonwealth Threat Abatement Plans
- Flora and Fauna Guarantee Regulations 2020
- IUCN criteria summary

Get Involved and Take Action

If you are interested in supporting this species' recovery, there are some important things you need to consider.

The Department of Energy, Environment and Climate Action (DEECA) is committed to engaging and partnering with Traditional Owners on how they wish to be involved in the planning and implementation of actions for this species. Steps must be taken to avoid harm and where appropriate ensure actions can deliver cultural benefits.

You can find advice about required approvals, land manager and/or owner permissions, options and incentives for private land conservation, and engagement with Traditional Owners and public land managers here: Action statements (environment.vic.gov.au)

To identify the relevant Traditional Owners, use the Aboriginal Cultural Heritage Register and Information System (ACHRIS) Welcome to Country and Acknowledgements Map.

You can also register your interest in taking action so we can connect you to other people or organisations working to help us secure the future for this species at threatened.species@deeca.vic.gov.au

Reporting Actions

Activity data is critical to monitoring the implementation and progress of actions and evaluating action statements. These data are also used to:

- Determine progress towards achieving the contributing targets for Protecting Victoria's Environment – Biodiversity 2037.
- Inform the five-yearly State of the Environment Report.

For guidance on reporting actions undertaken on this species, refer to Activity Data.

Submitting Monitoring Data

The Victorian Biodiversity Atlas (VBA) provides a foundational dataset showing where biodiversity occurs across the Victorian landscape and how it may have changed over time. As a core input for decision support tools that inform conservation action, public land management, research activities and reporting, we encourage all participants in the delivery of on-ground actions to submit species records and observations, including for introduced plants and animals, as they carry out their projects.

For further information see: Victorian Biodiversity Atlas (environment.vic.gov.au)

Sign up and begin submitting your data today at: https://vba.biodiversity.vic.gov.au/

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

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Accessibility

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