

Smoky Mouse fire fact sheet



National Smoky Mouse Recovery Team

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Purpose

This document aims to provide land managers and fire-response teams with background knowledge on the endangered Smoky Mouse to aid in planning and responding to fire in occupied Smoky Mouse habitat.

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|  EN Endangered | Federal: <i>EPBC Act 1999</i> Victoria: <i>FFG Act 1988</i> ACT: <i>Nature Conservation Act 2014</i> |
|  CR Critically Endangered | NSW: <i>Biodiversity Conservation Act 2016</i> |

The Smoky Mouse

Named for its soft blue-grey fur, the Smoky Mouse (*Pseudomys fumeus*) is a small (38 – 90 g) native species known from disjunct populations across south-east Australia in Victoria, NSW and the ACT. Several populations are considered extinct – the species has not been seen in the Otway Ranges since 1985, coastal East Gippsland since 1991, and the ACT since 1987 (Menkhorst and Broome 2008; Evans 2018; Ford and Burns 2023).

Smoky Mouse home range size varies, but is estimated to be 2-5 ha. Smoky Mice are nocturnal and dig complex underground burrow systems to nest in during the day. They are omnivorous, feeding on seeds, flowers, fruits, fungi and invertebrates, and can move hundreds of metres from their burrows to forage (Ford and Burns 2023). They breed through spring and summer, producing one or two litters of three or four pups per year (Woods and Ford 2000). The species is highly susceptible to predation by feral cats and foxes. Smoky Mice are also threatened by habitat loss and degradation, and the increasing frequency and severity of fire and drought under climate change (Menkhorst and Broome 2008; Ford and Burns 2023).

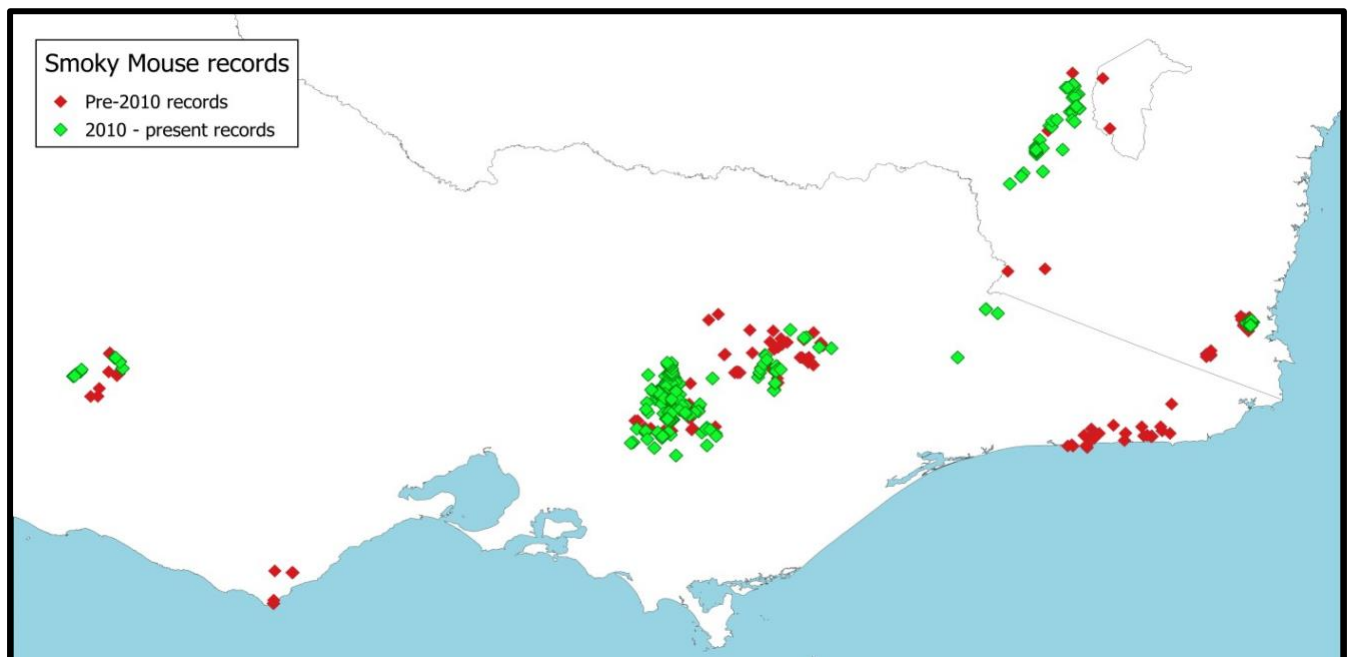


Figure 1. Smoky Mouse records across the species' national distribution. Populations in the Otways and coastal East Gippsland are considered extinct. Up-to-date detailed maps of specific areas are available on request.

What is Smoky Mouse habitat?

Smoky Mice can occupy a wide range of habitats from sea level to 1800 m including coastal dunes and heaths, sclerophyllous forests and woodlands, damp forests, wet forests, rocky escarpments, and sub-alpine heaths and woodlands. Fire plays an important role in Smoky Mouse habitats; the species thrives on disturbance-enhanced

flowering peas and heaths, however, the mouse also occurs in high abundance in long-unburned habitats with no recorded history of fire (Osborne and Preece 1987; Jurskis *et al.* 1997; Ford *et al.* 2003; Burns *et al.* 2016).

Due to its broad habitat preferences, identification of Smoky Mouse habitat for planning burns is best based on previous records of the species, with all records considered regardless of age. While broad-scale resurvey has occurred or is underway across much of the species' range, there remain areas where there has not been adequate survey effort in recent decades to determine local status. If you are unsure whether the species occurs in an area, or whether its local distribution may be broader than records indicate, please contact the Recovery Team for local insights or data that is yet to be uploaded to the relevant state database.

Fire response

Smoky Mice can persist in all post-fire age classes, from recently burned to long-unburned. Under the right circumstances, fire may enhance Smoky Mouse habitat and support persistence of the species, however, following high severity fire, the species may be lost from an area (Burns 2021), and too high-frequency fire may change floristic composition and render habitat unsuitable in the long-term. Smoky Mice usually nest in underground burrow systems and are expected to shelter safely in place during a fire event. In the postfire environment, however, small mammals can face food shortages and a dramatic increase in predation (Morris *et al.* 2011; Leahy *et al.* 2015; McGregor *et al.* 2017). Following high severity fire, the species appears to persist in areas with non-combustible ground-level shelter such as rock screes (Burns *et al.* 2016; Burns 2021); this may provide both protection from predators and habitat for food sources such as invertebrates and fungi.

Recommendations for delivering a Smoky Mouse-friendly burn or responding to bushfire

- **Patchy burns** – retaining patches of unburnt ground cover within the fire area is likely to provide refuge from predators and improve food availability (flowers, fruits, seeds, leaf matter, fungi and invertebrates). Patchiness within a home range and not the burn unit scale (e.g. 200 m x 200 m) will be critical. Burn objectives within areas known to be occupied by the species should be modified to aim for a maximum of approximately 50% coverage. Partnership with local First Nations communities to adopt cultural burning practices for the site may also support this.
- **High fuel moistures** – choosing to burn when fuel moistures are higher than local burn prescriptions can also help promote a suitably patchy burn. This may also be achieved by burning in the evening as relative humidity is increasing, under increasing cloud, or burning shortly after a rain event should conditions allow.
- **Avoid burning during spring and summer (breeding season)** – fire during the breeding season while females are pregnant or have young are in the nest may increase the risk of litter loss through stress and food shortages. The species is more reliant on vegetative food sources (flowers, fruits and seeds) during this period, amplifying the impacts of loss of mature vegetation through burning.
- **Minimise burning in drought years** – aside from increasing the risk of the fire severity being higher than intended, burning during drought means that the mice are likely already experiencing food stress. Vegetation will recover more slowly during drought, further reducing food availability and shelter. Consider excluding known occupied habitat from burning in drought years.
- **Phytophthora cinnamomi (PC) hygiene** – ensure staff are briefed on the risks of spreading PC and are provided with Phytoclean or methylated spirits to clean boots, equipment, vehicles and machinery. Many of the Smoky Mouse's preferred forage species are highly susceptible to PC, with the risk of spreading PC increased as a result of planned burn and bushfire operations.
- **Soil disturbance** – Avoid creation of new mineral earth breaks, using natural features (such as rocky scree, escarpments or creek line fuel moisture differences), or existing track and trail networks as burn control lines where feasible. Creation of new breaks may damage Smoky Mouse burrows and increase access for cats and foxes along these new pathways.
- **Predator control** – Pre- and post-fire cat and fox control is recommended where cover may be reduced in and around burnt areas, increasing the likely impacts of predation on a local population. In general, this is considered the highest priority management action for Smoky Mice following bushfire.
- **Fire retardant use** – Contact the Recovery Team to discuss fire retardant use in occupied areas.

Critical populations

While all remaining Smoky Mouse populations are important, there are several that are at particularly high risk due to their fire history, small size and isolation, and require additional focus in fire planning. These populations include:

- Limestone Rd, Native Dog Flat in the Cobberas, Alpine National Park, Vic.
- Victoria Range Rd and Happy Tk, Victoria Range, Grampians-Gariwerd National Park, Vic.; burned in 2013 and 2025 – impacts being assessed
- Mt William Range, Grampians-Gariwerd National Park, Vic.; burned in 2025 – impacts being assessed
- Smoky Mouse Species Management Planning Area of Nullica State Forest and Nullica Section South East Forest National Park, NSW (Forests NSW DECC 2008).

We're here to help!

The National Smoky Mouse Recovery Team includes members from land management agencies in all occupied states. If you have any questions, please reach out to us. We can provide advice on how to approach a planned burn in an occupied area, whether an area is currently occupied, or how to support the species after wildfire.

And we would love your help too – if you're planning a burn in Smoky Mouse country, please let us know! We are always keen to conduct pre- and post-burn surveys to continue learning how Smoky Mice respond to different sorts of fire. We are also always eager to get out as quickly as possible after bushfires to assess impacts on the species; where appropriate, please consider allowing our experts to access the fire ground as soon as possible.

Email Dr Phoebe Burns (Chair, National Smoky Mouse Recovery Team) at pburns@zoo.org.au to find out who the mouse people are in your region.

References

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