Australian Capital Territory

Nature Conservation (Smoky Mouse) Conservation Advice 2025

Notifiable instrument NI2025–306

made under the

Nature Conservation Act 2014, s 90C (Conservation advice)

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1 Name of instrument

This instrument is the *Nature Conservation (Smoky Mouse) Conservation Advice 2025*.

2 Commencement

This instrument commences on the day after its notification day.

3 Conservation advice for Smoky Mouse

Schedule 1 sets out the conservation advice for Smoky Mouse (*Pseudomys fumeus*).

4 Revocation

The *Nature Conservation (Smoky Mouse) Conservation Advice 2020* (NI2020-787) is revoked.

Linda Neaves
Chair, Scientific Committee
21 May 2025

Schedule 1

(see s 3)

ACT Government
Environment, Planning and Sustainable Development

ACT Scientific Committee

CONSERVATION ADVICE

SMOKY MOUSE

Pseudomys fumeus

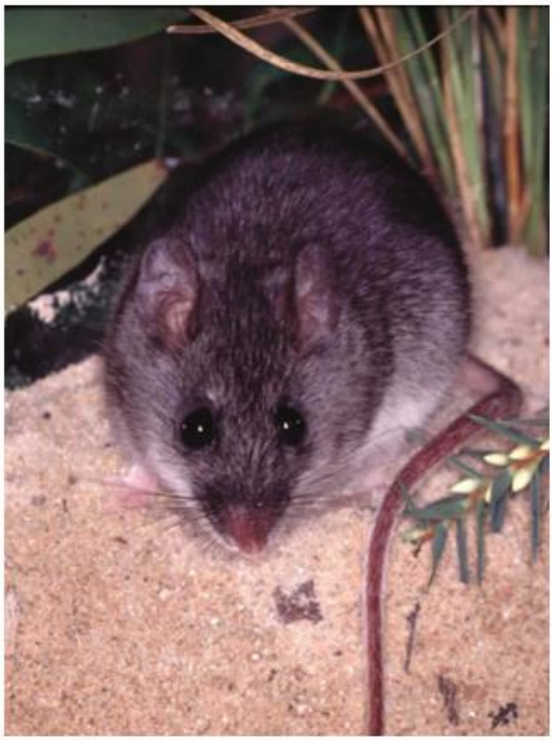
CONSERVATION STATUS

The Smoky Mouse *Pseudomys fumeus* Brazenor, 1934 is recognised as threatened in the following jurisdictions:

International	**Vulnerable**, International Union of Conservation of Nature (IUCN) Red List
National	**Endangered**, *Environment Protection and Biodiversity Conservation Act 1999*
	Vulnerable, The Action Plan for Australian Mammals 2012
ACT	**Endangered**, *Nature Conservation Act 2014*
NSW	**Critically Endangered**, *Biodiversity Conservation Act 2016*
VIC	**Threatened**, *Flora and Fauna Guarantee Act 1988*
	Endangered, Advisory List of Threatened Vertebrate Fauna in Victoria

ELIGIBILITY

The Smoky Mouse is eligible to be included in the Endangered category of the ACT Threatened Native Species List under the *Nature Conservation Act 2014* (NC Act) under the IUCN Criterion B – B2ab(iii,v)c(iv) (Threatened Species Scientific Committee ((TSSC) 2020). The factors that make it eligible include: the area of occupancy is likely to be restricted; the number of locations is limited; there is an inferred continuing decline in the area/quality of habitat and the number of mature individuals; and there are extreme fluctuations in the number of individuals (TSSC 2020).



Smoky·Mouse·(Gary·Mayo·—·ANU)

DESCRIPTION AND ECOLOGY

The Smoky Mouse is a large native mouse. It is pale grey to blue-grey/black above, with a pale grey to white belly (Cockburn 1995) and a ring of dark hairs around each of its large, bulging eyes. The feet are pink with white fur (Cockburn 1995). The species is distinguished by its bicoloured tail, which is blue-grey dorsally, white ventrally and lightly furred (Cockburn 1995). It has a head and body length of 85–100 mm, a tail length of

110–145 mm and weighs between 45–90g (Cockburn 1995).

Breeding is seasonal, with females producing one or two litters (of 3–4 young) per year, between October and January (Cockburn 1981; Menkhorst 1995). Breeding may be communal, with several females cohabiting in burrows (Woods & Ford 2000; Ford et al. 2003). Males and females breed in their first year, and many survive to breed in a second year (Cockburn 1981). Generation length is, therefore, estimated at 1–2 years (Woinarski et al. 2014).

The population undergoes large annual fluctuations in abundance, with a rapid decline in numbers occurring just before the breeding season due to the death or dispersal of young being forced to vacate their natal territory during autumn as food resources dwindle (Cockburn 1981). Only those finding high quality food are likely to survive the winter (Cockburn 1981).

The Smoky Mouse has a dietary preference for legume seed, epacrid fruits and Bogong Moths (*Agrotis infusa)* during summer months (Cockburn 1995; Ford 1998a). In winter and early spring, when few seeds are produced from the shrubs, the species switches to hypogeous (underground) truffle-like fungi that are common around the roots of certain shrubs and grasses (Cockburn 1995; Ford 1998; Ford et al. 2003).

DISTRIBUTION AND HABITAT

The Smoky Mouse occurs in Victoria, New South Wales (NSW) and the Australian Capital Territory (ACT), over a wide but disjunct distribution with small and fragmented populations (Menkhorst & Broome 2008). Important areas are The Grampians and South Eastern Highlands in Victoria, and the Eden Hinterland (NSW) which are the designated protection zones for the species, as well as, the discovery of a substantial and significant new population found north of Cabramurra in Kosciuszko National Park (NSW) in 2018-19 (L Broome pers comm 2019 in TSSC 2020). Almost 30 percent of the species' modelled, likely and known, distribution was within fire affected areas of the 2019-20 bushfire season (DAWE 2020).

In the ACT, two males were trapped in the Brindabella Ranges in Namadgi National Park, one from near Bulls Head in 1985 (Osborne and Preece 1986) and one from Mt Kelly in 1987 (Mayo 1987). The Smoky Mouse was recorded from a moist gully within wet montane forest, and from heath vegetation on rocky mountain tops. Since the initial discovery in the ACT all surveys for the species and other small mammals have failed to detect the Smoky Mouse in Namadgi National Park (Evans 2018).

The species' preferred habitat was identified as ridge-top sclerophyll forest (Cockburn 1995) with a diverse understorey of heathy shrubs however, a more recent study captured more individuals in damp drainage systems than on dry slopes (Burns et al. 2015). A characteristic of Smoky Mouse habitat (except for wet gullies) is the presence of floristically diverse heathy understorey (Cockburn 1981a, 1981b; Menkhorst and Seebeck 1981; Jurskis et al. 1997; Ford 1998a, 1998b; Ford et al. 2003) to provide a diversity of food resources (Ford et al. 2003). Adequate ground cover (low heath, grass tussocks, logs, rocks or leaf-litter) to provide refuge from feral predators and soil conditions conducive to the growth of hypogeal fungi (a major component of the diet) are also likely to be critical habitat elements (Menkhorst and Broome 2008).

In November 2020, a purpose-built Smoky Mouse Captive Breeding Facility was constructed at the University Canberra. The construction of the facility was a collaboration between NSW DPE, University of Canberra, Conservation Research (ACT Government) and Zoos Victoria. This colony has been successfully breeding individuals and two releases into a fenced feral-predator-free enclosure within Tidbinbilla Nature Reserve (TNR) in December 2022–January 2023 and September 2023 have occurred to date. These translocations will facilitate research that contributes to our understanding of habitat use, through

monitoring movements post release and investigating diet and resource use across its natural range to allow for better targeted local conservation.

THREATS

Threats to the Smoky Mouse are detailed in the Commonwealth Conservation Advice (TSSC 2020) which are drawn from those in the Mammal Action Plan (Woinarski et al. 2014), and include:

- predation by foxes, feral cats and wild dogs.
- habitat loss, fragmentation and degradation due to clearing and Cinnamon Fungus (*Phytophthora cinnamomi*)
- too frequent burning impacting habitat suitability and diversity of fungi
- climate change exacerbating changing fire impacts of increasing frequency and intensity.

Currently, the main threats to the species in the ACT are likely to be inappropriate fire regimes and predation by the European Red Fox and Cat. New threats impacting potential translocations are the predation by the exotic Black Rat, as well as adverse interactions through competition, including potential disease transmission. Climate change can be speculated to have some future impact on the Smoky Mouse in terms of altered fire regimes and possibly reduced habitat area (ACT Government 2013). Bushfire smoke in combination with rising summer temperatures may also impact populations. These will increasingly occur together under climate change predictions and may have caused the death of nine animals during the 2019-20 summer bushfires.

MAJOR CONSERVATION OBJECTIVE

The objective of the Action Plan (ACT Government 2013) is to maintain in the long term, viable, wild populations of the Smoky Mouse as a component of the indigenous biodiversity of the ACT and region. However, the species has not been found in the ACT for over three decades, therefore the focus should be to maintain and protect habitat and mitigate threats.

CONSERVATION PRIORITIES

Recommended management actions are provided and prioritised in the Commonwealth Conservation Advice (TSSC 2020) and Mammal Action Plan (Woinarski et al. 2014) as well as detailed in the ACT Action Plan (ACT Government 2013). In the ACT, all known habitat for the species is formally protected within Namadgi National Park. The main priorities applicable to Smoky Mouse habitat in the ACT include to:

- protect habitat (particularly unburnt areas) and improve understanding of the species ecology, including threats
- develop and implement long-term strategies to reduce impacts of exotic predators
- undertake predator control following burns where required
- undertake research to better understand optimal ecological burning regimes
- reduce the incidence and spread of Cinnamon Fungus infection
- periodically monitor for extant populations.

CONSERVATION ISSUES

It is recommended that quantitative targets and resourcing requirements are clearly identified in any Action Plan or other related projects/programs relevant to this species. Broader conservation issues need to be considered in developing and implementing actions arising from this advice.

Critical Habitat

Further investigation to determine the habitat critical to the survival of the species is required (Burns et al. 2015). There is no Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat under the EPBC Act.

Climate Change

Climate change impacts appear inevitable and will affect the likelihood of persistence, within the ACT, of many species. Most vulnerable in this regard are those species that occupy highly fragmented habitat with highly restricted distributions, such as the Smoky Mouse. Capacity must be developed to model the impact on the Smoky Mouse and its habitat under likely climate change scenarios if we are to anticipate and manage the impacts of climate change. This will require a combination of research and the development of in-house capacity for the collection of relevant data and its application in climate change modelling.

Population Viability

With highly fragmented and declining species, such as the Smoky Mouse, it is important to ensure actions maintain connectivity and genetic diversity to prevent functional extinction. This occurs when populations decline in abundance and become fragmented to such an extent and that the genetic diversity of the species is reduced leading to genetic problems (e.g., inbreeding depression) and the species no longer has the capacity to rebound should conditions improve or to respond to management intervention. An assessment of genetic variation and inbreeding risk should be made in the case of the Smoky Mouse, particularly for small and isolated populations to inform risks. If genetic problems exist more intensive options for bringing the species to a position where it has the potential to recover may need to be explored, such as genetic rescue.

Captive Colony

An aim in the National Recovery Plan (Menhorst and Broome 2008 and TSSC 2020) is to establish a captive breeding colony as an insurance population (TSSC 2020) as well as for nutritional studies and potential re-introduction (Menkhorst and Broome 2008). The captive colony established at the University of Canberra contributes to meeting this aim.

Reintroduction to the Wild

The Scientific Committee does not currently support releases of the Smoky Mouse to the wild in the ACT, until:

(a) a better understanding of the relative importance of habitat suitability, fire history and predation in the contribution to the decline of the species is established

(b) the status of other wild populations is established given the recent fire extent.

Jurisdictional Collaboration

The location of the species habitat in the ACT high country along the NSW border requires the development of any policies and action/recovery plans to be discussed between relevant jurisdictional entities.

Ngunnawal Community Engagement

The ACT Government should actively facilitate, the inclusion of the Ngunnawal people in the conservation of this species and its habitat as part of Ngunnawal Country. Reference to the Caring for Dhawura Ngunnawal: A natural resource plan for the ACT (ACT Government 2023) would be useful to inform

culturally appropriate resource management including of native species that aligns with achieving conservation outcomes for the species.

OTHER RELEVANT ADVICE, PLANS OR PRESCRIPTIONS

- ACT Action Plan — Smoky Mouse (ACT Government 2013)
- Commonwealth Conservation Advice — Smoky Mouse (TSSC 2020)
- National Recovery Plan – Smoky Mouse (Menkhorst and Broome 2008)
- Management Interventions for 119 Priority Animal Species (DAWE 2020)
- The Action Plan for Australian Mammals (Woinarski et al. 2014)

LISTING BACKGROUND

The Smoky Mouse was listed in the ACT as an Endangered species on 12 January 1998 in accordance with section 21 of the *Nature Conservation Act 1980*. At that time, the Flora and Fauna Committee (now the Scientific Committee) concluded that the assessment satisfied the following criteria:

1.2 Species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the near future, as demonstrated by:
1.2.6 Extremely small population.

The Smoky Mouse is eligible for listing as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as, prior to the commencement of the EPBC Act, it was listed as Endangered under the *Endangered Species Protection Act 1992* (Cwlth). The outcome of a reassessment under the EPBC Act in 2019, to take account of new information, confirmed it is still eligible to be listed in the Endangered category.

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FURTHER INFORMATION

Further information on this species or other threatened species and ecological communities can be obtained from Environment, Planning and Sustainable Development Directorate (EPSDD).
Phone: (02) 132281, EPSDD – Environment Website: https://www.act.gov.au/environment

ATTACHMENT A: LISTING ASSESSMENT (TSSC 2020)

Threatened Species Scientific Committee (Commonwealth) Listing Assessment

How judged by the Committee in relation to the EPBC Act criteria and regulations

Criterion 1. Population size reduction (reduction in total numbers)
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	**≥ 90%**	**≥ 70%**	**≥ 50%**
A2, A3, A4	**≥ 80%**	**≥ 50%**	**≥ 30%**

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:

Insufficient data to determine eligibility

The results of Smoky Mouse surveys undertaken to date are highly variable, with detections often followed by extended absences before being detected again at that site or nearby. For example, in the Grampians a Smoky Mouse population persisted for 40 years, despite extended periods of (probable) low abundance when it was undetected (Burns et al. 2015). There is evidence suggestive of regional extinctions, with Smoky Mouse not detected in the Otway Ranges, East Gippsland or Namadgi NP for two decades (Menkhorst & Broome 2006; Nelson et al. 2010; Belcher 2011). However, the live trapping of several individuals in Kosciuszko NP in 2015, after unsuccessful efforts to do so over a 70 year period (Schulz & Wilks 2017), demonstrates the difficulty in concluding that local extinction has occurred.

In Victoria, the population in the Central Highlands is by far the largest and occurs in the largest extent of habitat. Trends in the population are unclear. Sampling in the Central Highlands of Victoria in 2012 detected the Smoky Mouse at 21 of 120 sites (Lumsden et al. 2013). Surveys in 2018−19 by Zoos Victoria and the Museum Victoria at 150 sites across the Central Highlands failed to detect Smoky Mouse at two thirds of the sites from which Lumsden et al. (2013) found them at in 2012, but individuals were detected at 27 new sites (DELWP 2019. pers comm 15 October). In the Victorian Alps, only two records have been found post-2000 (DEWLP 2019. pers comm 15 October).

Previously, a large population existed at Mt William in the Grampians; Cockburn (1981a) reported 701 captures from 9600 trap-nights over the period 1976 to 1979. However, the population has declined substantially since (Menkhorst 1995; Nelson et al. 2009). Since the late 1970s some sites in the Grampians have been sampled intermittently (Cockburn 1981a,b; Homan 2008; Nelson et al. 2009), and some surveys have had relatively high detection rates, partly due to the introduction of a new survey technique (Nelson et al. 2009). Populations at Victoria Range in the Grampians may be declining; the population at one of the survey sites declined from 27 individuals in November 2012, to nine in 2013 and three in 2014 (Burns et al. 2015). However, due to natural fluctuations in population numbers, the trend is unclear.
In NSW, the population at Nullica has declined over the last two decades, with an estimated decline of greater than 50 percent over the last 10 years. During a six month study undertaken during 1997−98, the Smoky Mouse was one of the most commonly trapped rodents in the area, with 32 individuals captured (Ford et al. 2003). However, site occupancy rates have declined from 85 percent (20 sites sampled) in 1997−2004, to 31 percent (29 sites sampled) in 2005−2013 and 24 percent (29 sites sampled) in 2014−2018, and the population apears to have contracted to the centre/east region of the study area (L Broome 2019. pers comm 21 August). The population trend in Kosciuszko NP is undetermined (L Broome 2019. pers comm 31 July).

In the ACT, the only confirmed records are two individuals trapped in Namadgi NP in the 1980s. Subsequent surveys have failed to detect the species, including a large targeted survey undertaken in Namadgi NP in 1994. Most recently, a baited camera survey was undertaken in Namadgi NP in 2013−14, with 50 sites of potential habitat surveyed over a total of 500 trap-nights (Evans 2018). Sites were located in four main vegetation types, and included some of the most remote and difficult to access areas (these were accessed by helicopter), and the two sites where the species was previously trapped. No individuals were found. A range of other mammals, reptiles and birds were detected, including feral cats (12 percent of sites) and foxes (8 percent of sites) that were found even in the most remote locations. The surveys indicate that the Smoky Mouse is now absent in Namadgi NP, or if present is extremely rare.

Overall, a decline in population size over the past 10 years is suspected, due to declines reported at Nullica and ongoing threats facing the species. However, there are insufficient data to quantify trends in population size.

The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

Criterion 2.	Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy		
	Critically Endangered Very restricted	**Endangered Restricted**	**Vulnerable Limited**
B1. Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2. Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	**= 1**	**≤ 5**	**≤ 10**
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Evidence:

Eligible under Criterion 2 B2(a),(b)(iii,v),(c)(iv) for listing as Endangered

There is no robust estimate for the Area of Occupancy (AOO). However, available data indicates that the AOO is likely to be less than 500 km^2.

Based on the mapping of point records from the last 20 years (1999 to 2019) obtained from state governments and museums, the Extent of Occurrence (EOO) is estimated to be 102 270 km^2, and the Area of Occupancy (AOO) estimated to be 264 km^2. The EOO was calculated using a minimum convex hull, and the AOO calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines 2014 (DotE 2018). Using records from the last 40 years (going back to 1979), the estimated AOO is 604 km^2. However, this includes records from the Otways, East Gippsland and the ACT, where the species may no longer be extant.

The Victorian Department of Environment, Land, Water and Planning estimated the AOO to be 480 km^2 in Victoria, based on records from the past 50 years (post-1970) but excluding records from East Gippsland, the Otways, Teran and Lower Glenelg. They considered this a generous estimate given that population numbers and localities of the species fluctuate (DEWLP 2019. pers comm 15 October).

The ephemeral nature of populations makes a robust estimate of AOO difficult. A lack of detection may indicate that a population no longer occurs, or that it is persisting at very low levels. The above data indicates that the AOO is probably around 500 km^2, but it could be less if populations previously detected are no longer extant, or greater given there has been limited sampling throughout the species' range. Here we take a risk-based and precautionary approach and, given that the population appears to be declining, argue that the AOO is likely to be less than 500 km^2, which meets the threshold for Endangered under subcriterion B2.

The Smoky Mouse is subject to long acting, landscape scale threats that impact on individuals of the taxon sequentially or randomly over time. There are four discrete areas where the majority of individuals are potentially at risk of being impacted by these threats (notably feral predators and increased fires): the Grampians (Victoria), Central Highlands (Victoria), Eden/Nullica region (south-eastern NSW), and the Snowy Mountains (from Cabramurra to the Brindabellas, NSW). Therefore, the species is considered to occur at no more than five locations, which meets subcriterion (a).

A continuing decline in the area or quality of habitat can be inferred, based on clearing for forestry, the extent of habitat impacted by the recent 2019-20 bushfires, and the ongoing impacts of Cinnamon Fungus, which meets subcriterion (b)(iii). A continuing decline in numbers

of mature individuals is also inferred (see Criterion 1), which meets subcriterion (b)(v). The number of mature individuals undergoes extreme fluctuations, with captures at individual sites known to decline by an order of magnitude (e.g. from 30−40 to fewer than 3) within a period of two years (L Broome 2019. pers comm 21 August). This meets subcriterion (c)(iv).

The Committee considers that the species' area of occupancy is likely to be restricted, the number of locations is limited, there is an inferred continuing decline in the area/quality of habitat and number of mature individuals, and the number of individuals undergoes extreme fluctuations. Therefore, the species has met the relevant elements of Criterion 2 to make it eligible for listing as Endangered.

Criterion 3. Population size and decline			
	Critically Endangered Very low	**Endangered Low**	**Vulnerable Limited**
Estimated number of mature individuals	**< 250**	**< 2,500**	**< 10,000**
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	**Very high rate 25% in 3 years or 1 generation (whichever is longer)**	**High rate 20% in 5 years or 2 generation (whichever is longer)**	**Substantial rate 10% in 10 years or 3 generations (whichever is longer)**
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	**≤ 50**	**≤ 250**	**≤ 1,000**
(a) (ii) % of mature individuals in one subpopulation =	**90 – 100%**	**95 – 100%**	**100%**
(b) Extreme fluctuations in the number of mature individuals			

Evidence:

Eligible under Criterion 3 C2(b) for listing as Vulnerable

There is no robust estimate of population size for this species. The *Action Plan for Australian Mammals 2012* (Woinarski et al. 2014), which used information available up to December 2012, estimated that the total population may contain fewer than 10 000 mature individuals. Since that time the species has been recorded at some new sites (Lumsden et al. 2013) and there is evidence that it may occur across a wider range of habitats than considered previously (Burns et al. 2015). However, there is also some evidence of ongoing population decline (see Criterion 1).

Expert opinion is that the total population size is likely to be fewer than 10 000 mature individuals, with fewer than 1000 in NSW (L Broome 2019. pers comm 31 July; SAC 2019. pers comm 3 July). The species is inferred to be undergoing a continuing decline (see Criterion 1), and the number of mature individuals are likely to undergo extreme fluctuations (see Criterion 2), which meets subcriterion C2(b).

The Committee considers that the number of mature individuals are likely to be limited, there is an inferred continuing decline, and the geographic distribution is precarious for the survival of the species because the number of mature individuals undergoes extreme fluctuations. Therefore, the species has met the relevant elements of Criterion 3 to make it eligible for listing as Vulnerable.

Criterion 4. Number of mature individuals			
	Critically Endangered Extremely low	**Endangered Very Low**	**Vulnerable Low (Medium-term future)[1]**
Number of mature individuals	**< 50**	**< 250**	**< 1,000**
D2[1] Only applies to the Vulnerable category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time	-	-	**D2.** Typically: area of occupancy < 20 km^2 or number of locations ≤ 5

[1] The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the common assessment method.

Evidence:

Not eligible

The Committee considers that the population size of Smoky Mouse is very likely to be greater than 1000 mature individuals (see Criterion 3). The area of occupancy is estimated to be 264 km^2 and the species occurs at approximately five locations, which meets the quantitative threshold for Vulnerable under subcriterion D2. However, there is no plausible future threat that could drive the species to Critically Endangered or Extinct in a very short time. Despite ongoing threats from invasive predators, fire and drought, populations have persisted in some areas for decades, and the two major populations (at the Grampians and Central Highlands) are likely to persist. Therefore, the species does not meet the requirements for listing under D2.

The total number of mature individuals is not considered low; although the number of locations is restricted there is no plausible future threat that could drive the species to Critically Endangered or Extinct in a very short time. Therefore, the species has not met this required element of this criterion.

Criterion 5. Quantitative Analysis			
	Critically Endangered Immediate future	**Endangered Near future**	**Vulnerable Medium-term future**
Indicating the probability of extinction in the wild to be:	**≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)**	**≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)**	**≥ 10% in 100 years**

Evidence:

Insufficient data to determine eligibility

Population viability analysis has not been undertaken.