



## Consultation Document on Listing Eligibility

### *Pseudomys glaucus* (Blue-grey Mouse)

You are invited to provide your views and supporting reasons related to the eligibility of *Pseudomys glaucus* (Blue-grey Mouse) for inclusion on the EPBC Act threatened species list in the **Extinct** category.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing either by email to:  
[species.consultation@environment.gov.au](mailto:species.consultation@environment.gov.au)

or by mail to:

The Director  
Marine and Freshwater Species Conservation Section  
Biodiversity Conservation Division  
Department of Agriculture, Water and the Environment  
PO Box 787  
Canberra ACT 2601

**Responses are required to be submitted by 11 September 2020.**

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## General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at:

<http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2018.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at:

<http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at:

<http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

## Privacy notice

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department's obligations under the Privacy Act 1988 (Cth) and the Department's Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the '[common assessment method](#)'. As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.

The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how

the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: <http://environment.gov.au/privacy-policy>.

### **Information about this consultation process**

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

# *Pseudomys glaucus*

## Blue-grey Mouse

### Taxonomy

Conventionally accepted as *Pseudomys glaucus* Thomas, 1910.

### Species/Sub-species Information

#### Description

*Pseudomys glaucus* (Blue-grey Mouse) is known from just three specimens (Woinarski et al. 2014a). From the specimens, the appearance of the Blue-grey Mouse was similar to the extant *P. apodemoides* (Silky Mouse), which it was originally synonymised with until the Silky Mouse was recognised as a separate species (NPWS 2002; Dickman 2008). The Blue-grey Mouse was a robust mouse, estimated to weigh 25–30 g, with a head and body length of 95 mm, and a tail length of 100 mm. The fur was light blue-grey above and white below. The tail was covered in short white hairs over a pink skin (Dickman 2008).

#### Distribution

Due to the limited number of specimens, the extent of the historical distribution range of the Blue-grey Mouse cannot be confidently stated. However, the distribution range is known to include the area inland of the Great Dividing Range, from southern Queensland to northern New South Wales (NSW) (Woinarski et al. 2014a). Few collection details are known on any of the available specimens. Two specimens were collected from south Queensland in the late-19th century and a third was collected from Cryon, northern NSW (Woinarski et al. 2014a; Dickman 1993, 2008).

#### Extinction date

The Blue-grey Mouse is known to have gone extinct post-European settlement in Australia. However, with only the dates the specimens were presented to museums recorded (rather than the date of collection) an extinction date cannot be specified. The Queensland specimens were presented to the British Museum in 1892, whilst the NSW specimen was obtained and accessed by the Australian Museum in 1956 but was likely collected much earlier (Woinarski et al. 2014a; Dickman 1993, 2008).

#### Relevant Biology/Ecology

Almost nothing is known about the biology of the Blue-grey Mouse. Dickman (1993, 2008) considered it likely that the species occurred in sandy heathland or open forest habitats with a shrubby understorey that provided a year-round supply of seeds.

The morphologically similar Silky Mouse shelters in large and complex burrows comprising several nearly vertical shafts, a long tunnel system and a large nesting chamber. Burrows are often placed at the base of a *Banksia ornata* (Desert Banksia), the leaves and roots of which interact to create local areas of moist soil. Temporary surface shelters are also thought to be used by this species outside of breeding periods (OEH 2019).

#### Likely Causes of Decline and Extinction

Likely causes of decline and extinction are surmised from threats known to have occurred in the late-19th century and an assumption that the threats that affect many conilurine rodents (particularly the morphologically similar Silky Mouse) would also impact on the Blue-grey Mouse.

Table 1: Probable causes of decline towards extinction for the Blue-grey Mouse in approximate order of impact, based on available evidence.

Threat factor	Threat status and severity*	Evidence base
Introduced predators		
Predation by feral cats ( <i>Felis catus</i> )	<ul style="list-style-type: none"> <li>– Status: Historical</li> <li>– Confidence: Suspected</li> <li>– Consequence: Severe</li> <li>– Extent: Across the entire range</li> </ul>	<p>Feral cats are thought to have been present throughout the distribution range of the Blue-grey Mouse by the mid-19th century (Dickman 1993).</p> <p>Predation by feral cats has been implicated in the extinction and ongoing decline of many terrestrial, non-volant, mammal species (Dickman 1993; Smith &amp; Quin 1996; Woinarski et al. 2014b; Hardman et al. 2016; Davies et al. 2017; Radford et al. 2018; Woolley et al. 2019), particularly in arid and semi-arid habitats (Christensen &amp; Burrows 1994; Moseby et al. 2011; Davies et al. 2018; Woolley et al. 2019), with vertebrate prey up to four kg taken (DoE 2015). Woinarski et al. (2014b) considered predation by feral cats to be the most critical factor in the decline and extirpation of Australia's mammal fauna.</p> <p>Fire and stock grazing can amplify the impacts of predation on small mammals by reducing ground cover, particularly following high-intensity burns (Smith &amp; Quinn 1996; Leahy et al. 2015). The number of predators attracted to the burnt area (Hradsky et al. 2017), individual predator activity (Leahy et al. 2015), and hunting success (McGregor et al. 2015) have all been observed to increase where habitat has been modified through frequent burning. Therefore, threats from predation would have increased as European settlement spread throughout the accepted distribution range.</p>
Predation by European red fox ( <i>Vulpes vulpes</i> )	<ul style="list-style-type: none"> <li>– Status: Historical</li> <li>– Confidence: Suspected</li> <li>– Consequence: Severe</li> <li>– Extent: Across the entire range</li> </ul>	<p>The European red fox arrived in the arid and semi-arid zone of NSW and Queensland around 1900–1910 (Dickman 1993; Johnson 2006).</p> <p>Predation by the red fox has been implicated in the extinction and decline of many terrestrial, non-volant mammal species in Australia (Richards 2004; DEWHA 2008; Woinarski et al. 2014c; Radford et al. 2018) and was identified by Smith &amp; Quin (1996) as having a significant impact on small isolated populations of threatened species, being able to eliminate them even at low densities.</p> <p>As identified above, fire can amplify the impacts of predation on small and medium-sized</p>

		mammals (Leahy et al. 2015; McGregor et al. 2015; Hradsky et al. 2017).
Habitat loss and fragmentation		
Habitat degradation and resource depletion by livestock	<ul style="list-style-type: none"> <li>– Status: Historical</li> <li>– Confidence: Suspected</li> <li>– Consequence: Severe</li> <li>– Extent: Across the entire range</li> </ul>	<p>Most of arid and semi-arid inland NSW was occupied by stock by the late-19th century (Condon 1978 cited in Dickman 1993; Lunney 2001). Sheep numbers in the Western Division of NSW alone exceeded ten million at this time, greatly exceeding the carrying capacity of the land (Barnard cited in Dickman 1993).</p> <p>Grazing by stock removes shrub cover (Dennis 2001; McDowell et al. 2015) and the green stems, leaves and seeds that likely comprised the bulk of the Blue-grey Mouse's diet and may have degraded or destroyed potential refuges during times of drought (Richards 2004; Tunbridge 1993; Morton et al. 1995).</p> <p>Trampling by stock compacts and powders topsoil, renders soil too loose for digging (Dickman 1993). It is unknown whether the Blue-grey Mouse was a sub-surface burrower and possibly severely impacted by trampling. However, the Silky Mouse is known to shelter in complex burrows (NPWS 2002; OEH 2019) and it is possible the Blue-grey Mouse shared this behaviour.</p>
Habitat degradation and resource depletion by introduced European rabbits ( <i>Oryctolagus cuniculus</i> )	<ul style="list-style-type: none"> <li>– Status: Historical</li> <li>– Confidence: Suspected</li> <li>– Consequence: Severe</li> <li>– Extent: Across the entire range</li> </ul>	<p>By the late-19th century, European rabbits had reached Queensland and were recorded in high population densities throughout arid and semi-arid NSW (Dickman 1993; Lunney 2001).</p> <p>Rabbits compete with native fauna for food and degrade the habitat by intensively grazing on native vegetation and ringbarking trees (Richards 2004). In large numbers, rabbits turn areas of productive, well-vegetated country into a virtual desert, greatly impacting sympatric mammals (Johnson 2006). Where rabbits are found in abundance, conilurine rodents experience significantly greater reductions in population than in areas which have fewer rabbits (Smith &amp; Quin 1996).</p> <p>Rabbits, with high standing biomass and high rate of increase, provide abundant prey for predators as native species decline. Therefore, rabbit presence supports elevated predator populations and predation pressures on native mammalian species. Native species are also easier to catch, being without the behavioural or morphological defences to avoid detection or capture (Richards 2004; Pedler et al. 2016; Radford et al. 2018).</p>

Fire		
Change in fire regime	<ul style="list-style-type: none"> <li>– Status: Historical</li> <li>– Confidence: Suspected</li> <li>– Consequence: Unknown</li> <li>– Extent: Across the entire range</li> </ul>	<p>The degree to which a change in fire regime impacted the Blue-grey Mouse is unknown. Johnson (2006) believed that a change in fire regime made little direct contribution to mammal extinctions, with declines related to increased predator activity after fire and not the fire itself (Leahy et al. 2015; McGregor et al. 2015; Hradsky et al. 2017).</p> <p>Smith &amp; Quin (1996) identified that some small, fire sensitive, <i>Pseudomys</i> species (<i>P. novaehollandiae</i> (New Holland Mouse), <i>P. gracilicaudatus</i> (Eastern Chestnut Mouse) and <i>P. apodemoides</i> (Silky Mouse)) remain reasonably widespread despite a change in fire regime.</p>

Status: “historical/ current/ future” – identify the temporal nature of the threat

Confidence: “suspected/ inferred/ known” – identify the extent to which we have confidence about that threat

Consequence: “severe/ moderate/ low/ unknown” – identify the severity of that threat

Trend: “decreasing/ static / increasing / unknown” – identify the extent to which it will continue to operate on the species

Extent: “across the entire range/across part of its range / unknown.” – identify its spatial context

## **Assessment of available information in relation to the EPBC Act Criteria and Regulations**

The Blue-grey Mouse is known from just three specimens collected from southern Queensland and inland northern NSW. The collection dates are unknown, but Museum records show the Blue-grey Mouse has not been recorded after 1892 in Queensland and the sole NSW specimen was likely collected much earlier than the 1956 date it was received by the Australian Museum (Woinarski et al. 2014a). Given the poor collection data, a likely decade of extinction cannot be determined for this species.

The Blue-grey Mouse is listed as Extinct under the NSW *Biodiversity Conservation Act 2016* (OEH) and not listed under the Queensland *Nature Conservation Act 1992* (DES 2018). The Blue-grey Mouse is listed Extinct under the IUCN Red List (Burbidge & Woinarski 2016) and in the Action Plan for Australian Mammals (Woinarski et al. 2014a). Dickman (1993) considers the Blue-grey Mouse Extinct in NSW and Dickman et al. (2000) considers the species Extinct in Queensland.

Biological surveys for rodents have been conducted throughout the accepted historical range of the Blue-grey Mouse without recording the species. Dickman et al. (2000) assessed the status of native rodents in Queensland using locality records from museums, literature records and unpublished field reports. Of the original 41 rodent species, eight were found to be extinct, including the Blue-grey Mouse. Wildlife surveys conducted throughout inland northern NSW, during the 1990s, did not detect the Blue-grey Mouse (NPWS 2002). In particular, surveys around Cryon (the collection site of the only NSW specimen) did not record any native rodents (Dickman 2008).

Native conilurine rodents, of which just over half are *Pseudomys* species, have undergone a more severe rate of extinction than that of mammalian fauna as a whole (Smith & Quin 1996; Woolley et al. 2019). In particular, the greatest loss of rodent species comes from inland arid and semi-arid regions, where the collection sites for the Blue-grey Mouse are located. Nearly two-thirds (11 out of 17) of inland rodent species are extinct in NSW. Of the remaining six species, all but one are rare or sparsely distributed (Dickman 1993). Similarly, southern Queensland has relatively more threatened and extinct species than the north, with eight of the 17 original rodent species believed to be in decline or extinct (Dickman et al. 2000).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct**. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

### **Collective list of questions – your views**

#### **Information to aid listing assessment**

1. Do you have further information on past or potential searches or research activities for the species?
2. Can you provide information on specimen records, including collection location and date?
3. Can you provide additional information on the range or location of populations, or a historic range (national extent)?
4. Do you have any additional information in regard to the ecology or biology of the species?
5. Do you further information on the historic threats that faced the species?
6. Are you aware of other knowledge (e.g. indigenous ecological knowledge) that may help better understand the species?
7. Are you aware of any cultural importance or use that the species had?

#### **Any other information**

8. Do you have comments on any other matters relevant to the assessment of this species?

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