



Consultation Document on Listing Eligibility and Conservation Actions

Burramys parvus (mountain pygmy-possum)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Burramys parvus* (mountain pygmy-possum) for inclusion on the EPBC Act threatened species list in the Critically Endangered category; and
- 2) the necessary conservation actions for the above species.

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

or by mail to:

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

Responses are required to be submitted by 15 March 2017.

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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/biodiversity/threatened/pubs/guidelines-species.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>.

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.

Burramys parvus

mountain pygmy-possum

Note: The information contained in this conservation advice was primarily sourced from 'The Action Plan for Australian Mammals 2012' (Woinarski et al., 2014). Any substantive additions obtained during the consultation on the draft will be cited within the advice. Readers may note that conservation advices resulting from the Action Plan for Australian Mammals show minor differences in formatting relative to other conservation advices. These reflect the desire to efficiently prepare a large number of advices by adopting the presentation approach of the Action Plan for Australian Mammals, and do not reflect any difference in the evidence used to develop the recommendation.

Taxonomy

Conventionally accepted as *Burramys parvus* (Broom, 1896). No subspecies are recognised.

Species/Subspecies Information

Description

The mountain pygmy-possum is the largest of the five species of pygmy-possum (family *Burramyidae*). It has a head-body length of 10–11 cm, a tail length of 13–15 cm and adults weigh 35–80 g. The dorsal fur is uniformly mid-grey, tinged brown; the underparts and cheeks are cream or fawn. Conspicuous black patches surround the dark, round eyes. The tail is thin, pinkish-grey and naked except for the basal 2 cm which is furred (Menkhorst & Knight 2004).

Distribution

The mountain pygmy-possum is endemic to alpine, sub-alpine and montane areas of mainland south-eastern Australia. Within this range it occurs in three separate regions: at Kosciuszko National Park (New South Wales), the Mt Buller area (Victoria), and the Mt Bogong-Mt Higginbotham area (Victoria); with some fragmented distributions within these general regions. These three regions are effectively isolated from one another by low elevation valleys containing unsuitable habitat for the species (DELWP 2016), and populations between them are highly genetically distinct (Osborne et al., 2000; Mitrovski et al., 2007a, b).

Within each region, there is variation in local population dynamics, a small amount of dispersal between patches, density dependence at the local population level (McCarthy & Broome 2000; Broome 2001a), and extinctions and recolonisation of small habitat patches. Larger, stable, demographically productive local sub-populations, such as those across the Mt Higginbotham-Mt Loch area, probably have the highest impact on meta-population persistence (Broome 2001a) because they most likely act as source populations for surrounding, lower quality or smaller habitat patches that undergo periodic local extinctions and are recolonised from nearby populations (DELWP 2016).

Relevant Biology/Ecology

The mountain pygmy-possum is a specialised mountain species, with an ecology linked to the highly seasonal environment. It is nocturnal and terrestrial. It occurs mostly in boulder-fields and rock screes, around or above the upper limits of the tree-line (mostly from about 1400 to 2230 m a.s.l., but there are some Kosciuszko records at about 1200 m a.s.l.; Schulz 2011, 2012a). Vegetation in such boulderfields mostly comprises alpine shrubby heathlands, especially those with *Podocarpus lawrencei* (mountain plum-pine). Males and females may occupy different areas and habitats, with females typically occupying higher quality habitat (i.e. higher elevation, more complex and deep boulder-fields, with higher densities of *Agrotis infusa* (bogong moths) (Broome 2001a,b). Habitat use may vary between summer and winter (Broom 2001b), with suitability for hibernation refuge (deep boulderfields and an insulating layer of snow) determining

winter habitat suitability (Körtner & Geiser 1998). The mountain pygmy-possum has used artificially created habitat (spoil dumps) in Kosciuszko National Park (Schulz et al., 2012a,b).

The extent of suitable habitat was thought to impose a strong limiting factor on population size, and to impose density-dependent population growth (McCarthy & Broome 2000). However, more recent observations have increasingly suggested early snow-melt and food limitations may be important (Menkhorst et al., 2012; Broome et al., 2012a). Population density can be high in (the small areas of) high quality habitat, with densities of nearly 100 individuals/ha reported in some areas (Menkhorst et al., 2012). Elsewhere, densities are much lower, with some patches of habitat containing fewer than 10 adults. Due to their smaller boulder size and higher productivity, the basalt boulderfields of Victoria can support higher densities than the granite boulderfields of Kosciuszko (Mansergh & Broome 1994; Heinze et al., 2004).

The diet includes invertebrates (particularly bogong moths), nectar, seeds, berries and other fruits (Mansergh et al., 1990; Smith & Broome 1992). Activity is markedly seasonal: reproduction, most feeding and growth is restricted to a 5-month period between snow melt (late spring) and the onset of cold weather (autumn) (Mansergh & Scotts 1990; Mansergh & Broome 1994).

Reproduction is highly seasonal, with breeding activity commencing soon after emergence from hibernation. Mountain pygmy-possums have a highly biased sex ratio (many more females, probably because these occupy better habitat) and are polygynous (with males mating with multiple females). Females typically produce a single litter, of typically four young, in October–November (Broome 2001a), but occasionally second litters are produced (but these typically fail to survive winter: Menkhorst et al., 2008). Longevity can be up to 12 years for females and five years for males, but the majority of individuals survive for 1–3 years only (Menkhorst et al., 2012). Sexual maturity is reached in one year, so generation length is taken to be 3–4 years (Woinarski et al., 2014).

Threats

Table 1 – Threats to the numbat in approximate order of severity of risk, based on available evidence

Threat factor	Consequence rating	Extent over which threat may operate	Evidence base
Habitat loss, fragmentation and degradation	Catastrophic	Large	Much of the species' range is within or near ski resorts (c. 80% of the Victorian range and c. 40% of the New South Wales range; Menkhorst et al., 2012), where some habitat has been destroyed and much of the remaining habitat has been fragmented or degraded by resort development, slope grooming (and use of exotic grasses for ski runs) and other associated activities.
Inappropriate fire regime	Severe	Entire	Severe fires reduce habitat quality, especially for the long-lived food plant <i>Podocarpus</i> ; about 50% of range at the Mt Bogong area and 20% in the Mt Kosciuszko area was burnt in the 2003 bushfires (Menkhorst et al., 2008).
Predation by foxes (<i>Vulpes</i>)	Severe	Entire	Predation by foxes has been recorded, and regarded as a

<i>vulpes</i>)			significant threat (Menkhorst et al., 2008); predation intensity may increase with global climate change (Menkhorst et al., 2012).
Predation by feral cats (<i>Felis catus</i>)	Severe	Entire	Predation by cats has been recorded, and regarded as a significant threat (Menkhorst et al., 2008); predation intensity may increase with global climate change (Menkhorst et al., 2012).
Decline in bogong moths	Moderate	Moderate	Bogong moths are the primary and most abundant food source for mountain pygmy-possums. Threats to bogong moths include loss of native grassland habitat, use of agricultural chemicals in their breeding sites, drought induced by climate change, artificial lighting which can interfere with their navigation (DELWP 2016).
Loss of genetic diversity	Moderate	Moderate	The Mt Buller population has experienced 'the most rapid loss of genetic diversity ever recorded in a mammal' (Mitrovski et al., 2007; Menkhorst et al., 2012).
Climate change	Unknown	Entire (in future)	The species' entire range is likely to be substantially affected by a predicted rise in temperature, with likely impacts on hibernation cover, predator abundance, abundance of key dietary items, and fire regimes (Broome et al., 2012a).
Winter recreational activities	Moderate	Moderate	Skiing and snowboarding can damage underlying vegetation, and compact snow which can eliminate the underlying space where animals reside during winter (Broome 1992; Sanecki et al., 2006), and decrease insulation and disturb hibernation (DELWP 2016). Noise and vibration may also cause more frequent arousals from hibernation (DELWP 2016).
Erosion and sedimentation	Minor	Minor	Degradation of boulderfield habitat can occur if soil and silt is deposited between/under rocks into nesting and hibernation spaces. This can occur due to erosion exacerbated by loss of vegetation cover, and sediment movement from construction or mechanical disturbance (e.g. snow-grooming) (DELWP 2016).
Indirect poisoning	Moderate (unknown)	Moderate	There is evidence of arsenic in bogong moths, presumed to be from contamination in the lowland parts of the pygmy-possum's

			dispersal range (Green et al., 2001; Green 2008). The impact on pygmy-possums is unknown.
Weeds and competition from introduced herbivores	Minor	Minor	Some weed species are considered to reduce habitat quality (Menkhorst et al., 2012), particularly willows (<i>Salix</i> spp), apple (<i>Malus pumila</i>) and blackberry (<i>Rubus fruticosus</i>). Introduced grasses and clover along roads and ski runs attract rabbits and hares, which have the potential to sustain predator populations and have grazing and erosion impacts (DELWP 2016).

Assessment of available information 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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> <p style="text-align: center;">based on any of the following</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

Evidence:

There have been substantial and long-standing monitoring programs for most locations (since 1981 in Victoria and 1986 in NSW). Data show some inter-year variation associated with climatic variation (particularly extent and duration of snow cover and temperatures in early winter), but also longer-term pronounced declining trends with marginal sites more susceptible to rapid losses (McCarthy & Broome 2000; Heinze et al., 2004; Broome et al., 2012b; Menkhorst et al., 2012). From around the late 1990s, declines in the populations at Mt Buller and the Kosciuszko region were observed (Table 2).

The most marked decline in numbers has been on Mt Buller, which declined from about 300 adults in 1996 (Heinze & Williams 1998) to only 40 in 2010 (Heinze 2010). Causes of the decline are attributed to a combination of habitat loss and fragmentation due to ski resort development and increased predation risk from cats and foxes, and consequent inbreeding (Mitrovski et al., 2007b). Low numbers of bogong moths at Mt Buller observed during 1999–2009 (D. Heinze unpubl. data 2010), possibly caused by widespread drought throughout eastern Australia from

the late 1990s to 2009, may have also contributed to the decline of mountain pygmy-possums and magnified the effects of inbreeding (DELWP 2016).

The population in Kosciuszko National Park was estimated to have 615 adults in 2000 (Broome et al., 2005), which declined to 355 adults by 2009 (Broome et al., 2012a). However, following four years of high rainfall (2010–2013) populations at most of the monitored sites appear to have recovered by November 2013 to pre-drought sizes (Broome et al., 2012b; Broome et al., 2013). In 2010–2011 additional colonies were discovered in the northern region of Kosciuszko National Park (Schulz et al., 2012a,b); numbers in this region are estimated to be 250–350 adults based on trapping densities and mapping of potential habitat (Broome et al., 2013).

Bushfires in 2003, 2006 and 2013 impacted all three regional populations, with some fire-affected local subpopulations at critically low levels and at risk of local extinction (Heinze 2012). There is an inferred continuing decline in population size (Woinarski et al., 2014).

Table 2 – Estimates of population sizes since 1990, showing percentage decline 1990 to 2010 (Woinarski et al., 2014; DELWP 2016; Broome et al., 2013)

Year	Site				Total
	Mt Kosciuszko area – south	Mt Kosciuszko area – north**	Mt Bogong area	Mt Buller area*	
1990–96	615	n/a	1735	300	2650
2009	355 (-42% change)	n/a	1680 (-3%)	40 (-87%)	2075 (-22%)
2011–13	620	330	no new data	no new data	2670

* population at Mt Buller discovered in 1996

** population at N Kosciuszko discovered in 2010

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. 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.

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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions indicating distribution is precarious for survival:			
(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:

Menkhorst et al. (2008) estimated the species' extent of occurrence to be less than 100 km². Modelling based on the species' alpine and sub-alpine habitat suggests that the total area of suitable habitat at the three locations is less than 6 km² (<3 km² in the Mt Kosciuszko area; <2 km² in the Mt Bogong-Higginbotham area, and <1 km² at Mt Buller) (Menkhorst et al., 2012). However, in 2010 a subpopulation was discovered at Happy Jack's Valley in the north of Kosciuszko at c. 1200 m a.s.l. (about 300 m below the winter snowline: K. Green pers. comm., cited in Woinarski et al., 2014), which is outside the area of modelled habitat (Schulz 2011; Schulz et al., 2012a) and suggests that the actual area of occupancy is larger than previously recognised. In 2012, two additional subpopulations (Rough Creek headwaters and Snow Ridge) were also located in the general area of Kosciuszko (Schulz et al., 2012a). Woinarski et al. (2014) estimate the area of occupancy to be less than 10 km², which meets the threshold for Critically Endangered under Criterion B2.

The species' distribution is severely fragmented, which satisfies condition (a). Its habitat occurs as a series of small patches (<1 ha, with few greater than 5 ha) separated from each other by distances of several hundred metres to several kilometres (DELWP 2016). There is an inferred continuing decline in the number of mature individuals (Woinarski et al., 2014), which satisfies condition (b)(iv).

The data presented above appear to demonstrate that the species is **eligible for listing as Critically Endangered** under this criterion. 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.

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
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

Evidence:

Over the last two to three decades, intensive survey and monitoring has provided a robust assessment of total population size and trends. As at 2016, the total population size (including a rough estimate of 330 adults in three new colonies and additional as yet unsurveyed potential sites in the northern region of Kosciuszko National Park) is estimated to be 2670 adults, with around 950 in the Mt Kosciuszko area, 1680 in the Mt Bogong-Mt Higginbotham area, and 40 at Mt Buller (Heinz et al., 2004; Broom et al., 2013; Mitrovski et al., 2007b; DELWP 2016). An

additional approximately 100 individuals are held in a captive breeding colony at Healesville Sanctuary.

The number of mature individuals is estimated to be around 2670 (i.e. limited). There is an inferred continuing decline in the number of mature individuals (Woinarski et al., 2014) and the number of mature individuals in each subpopulation is fewer than 1000 (see Criterion 1), which satisfies Criterion C2(a)(i).

The data presented above appear to demonstrate that the species is **eligible for listing as Vulnerable** under this criterion. 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.

Criterion 4. Number of mature individuals			
	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

The total number of mature individuals is estimated to be around 2670 which is not considered low, very low or extremely low.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. 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.

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:

A population viability analysis undertaken by McCarthy & Broome (2000) showed that small, isolated populations of mountain pygmy-possums were relatively safe from extinction. When equilibrium population size was greater than 18 females, extinction risk within 100 years was estimated at <1%. Given that there are multiple populations of the species with significantly more than 18 females, it appears unlikely that extinction will result at the species level within any timeframe relevant to this criterion.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. 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.

Conservation Actions

Recovery Plan

A recovery plan for the mountain pygmy-possum (DELWP 2016) was developed by the State of Victoria, and adopted as a national recovery plan under the EPBC Act in 2016.

The objectives of the recovery plan are to:

- Maintain or increase the number of mountain pygmy-possums in wild sub-populations that have declined and at least maintain current population levels at remaining sites
- Maintain the Victorian captive population and establish NSW captive breeding populations of the mountain pygmy-possum
- Restore and prevent damage to habitat
- Investigate key aspects of the biology and ecology of the mountain pygmy-possum
- Assess the capacity of the mountain pygmy-possum to adapt to climate change and investigate alternate strategies to assist their long-term survival
- Increase community awareness of and support for the conservation of the mountain pygmy-possum.

Primary Conservation Actions

1. Control the numbers of foxes, feral cats and rabbits/hares.
2. Continue to undertake captive breeding and supplementation of wild populations.
3. Increase and restore native vegetation and boulderfield habitat.

Conservation and Management Priorities

The entire range of the mountain pygmy-possum lies within protected areas (albeit much in ski resort leases), in which this species is an iconic and primary conservation asset. There is substantial ongoing management actions relating to research, survey, habitat protection and rehabilitation, fire management, monitoring, predator management, captive-breeding, and restoring connectivity (Woinarski et al., 2014).

Conservation actions are outlined in the table below.

Theme	Specific actions	Priority
Active mitigation of threats	Implement fire control measures that benefit this species	High
	Implement broad-scale management of introduced predators and herbivores; and intensive local-scale implementation at and around important subpopulations	High
	Restore habitat connectivity to now-fragmented habitat	Medium-high
	Continue to constrain and guide resort development at key sites	Medium-high
	Control weeds at key sites	Medium
Captive breeding	Maintain and enhance captive breeding program	High
Quarantining isolated populations	N/a	
Translocation	Maintain (and monitor success of) re-introduction programs to priority sites, e.g. Mt Buller	High
	Develop and trial translocations to non-montane sites (e.g. Broome et al., 2012a)	Medium-high

Community engagement	Maintain or enhance collaborative management with ski resort agencies	Medium-high
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Survey and Monitoring priorities

Theme	Specific actions	Priority
Survey to better define distribution	Sample across habitats similar to new records from Kosciuszko area (Schulz 2011; Schulz et al., 2012a)	Medium
Establish or enhance monitoring program	Maintain integrated monitoring programs across subpopulations	High
	Monitor the abundance of introduced predators at key subpopulations, in response to management actions	High
	Monitor the abundance of key food sources	Medium
	Monitor the incidence of fire, and vegetation response, at key subpopulations	Medium

Information and Research priorities

Theme	Specific actions	Priority
Assess impacts of threats on species	Identify the population-level responses to a range of fire regimes, and model population viability across all fire scenarios	Medium
	Assess the abundance of feral cats and red foxes in the range of this species, and the impact of predation on population viability	Medium
	Identify likely responses (of habitat, predators, competitors, food items; and of ecology, reproduction and physiology) to climate change	Medium
Assess effectiveness of threat mitigation options	Assess the efficacy and impacts of management options to reduce fire incidence, extent and intensity	High
	Assess the effectiveness of options for broad-scale control of introduced predators; or of local scale control at sites with important populations	High
	Measure the effectiveness of management actions that aim to constrain the impacts of ski resort development and use	High
Resolve taxonomic uncertainties	N/a	
Assess habitat requirements	Assess the extent to which the species' preferred habitat may be affected by different fire regimes	Low-medium
	Assess likely responses of key plant species to projected climate change	Low-medium
Assess diet, life history	Identify the source of arsenic in bogong moth populations, and potential impacts of such contamination on mountain pygmy-possums	Medium-high

	Assess the likely consequences on survival and reproductive success of earlier snow-melt (due to climate change)	Medium
Other	Investigate factors constraining success of captive breeding programs	Medium

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Consultation questions

1. Do you agree with the current taxonomic position of the Australian Faunal Directory for this taxon (as identified in the draft conservation advice)?
2. Can you provide any additional references, information or estimates on longevity, age of maturity, average life span and generation length?
3. Has the survey effort for this taxon been adequate to determine its national distribution and adult population size?
4. Do you accept the estimate provided in the nomination for the current population size of the taxon?
5. For any population with which you are familiar, do you agree with the population estimate provided? If not, are you able to provide a plausible estimate based on your own knowledge? If so, please provide in the form:
 - Lower bound (estimated minimum):
 - Upper bound (estimated maximum):
 - Best Estimate:
 - Estimated level of Confidence: %
6. Can you provide any additional data, not contained in the current nomination, on declines in population numbers over the past or next 10 years or 3 generations, whichever is the longer?
7. Is the distribution as described in the nomination valid? Can you provide an estimate of the current geographic distribution (extent of occurrence or area of occupancy in km²) of this taxon?
8. Has this geographic distribution declined and if so by how much and over what period of time?
9. Do you agree that the taxon is eligible for inclusion on the threatened species list, in the category listed in the nomination?
10. Do you agree that the threats listed are correct and that their effects on the taxon are significant?
11. To what degree are the identified threats likely to impact on the taxon in the future?
12. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this taxon at any stage of its life cycle?
13. In seeking to facilitate the recovery of this taxon, can you provide management advice for the following:
 - What individuals or organisations are currently, or need to be, involved in planning to abate threats and any other relevant planning issues?
 - What threats are impacting on different populations, how variable are the threats and what is the relative importance of the different populations?
 - What recovery actions are currently in place, and can you suggest other actions that would help recover the taxon? Please provide evidence and background information.
14. Can you provide additional data or information relevant to this assessment?
15. Can you advise as to whether this species is of cultural significance to Indigenous Australians?