



Consultation Document on Listing Eligibility

Melomys rubicola (Bramble Cay Melomys)

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

- 1) the eligibility of *Melomys rubicola* (Bramble Cay Melomys) 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 and Energy.

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 13 July 2018.

Contents of this information package	Page
General background information about listing threatened species	2
Information about this consultation process	3
Draft information about the species and its eligibility for listing	4
References cited	9
Consultation questions	10

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>.

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.

Melomys rubicola

Bramble Cay Melomys

Taxonomy

Conventionally accepted as *Melomys rubicola* Thomas, 1924.

Genetic studies indicate that *M. rubicola* is more closely related to Australian *Melomys*, particularly *M. capensis*, than to any of the New Guinean species (Bryant et al. 2011). No subspecies are recognised.

Species Information

Description

The Bramble Cay Melomys was one of the mosaic-tailed rats, which are distinguished by the mosaic pattern of scales on their tails rather than the concentric rows of scales running along the length of the tail found in most other types of rats and mice (DEHP 2016). It was larger than the three other Australian species of *Melomys* and about the size of a small rat (body length: 148–165 mm; tail length: 145–185 mm) (DEHP 2016). Also distinguishing it from other Australian *Melomys* was that its tail was obviously lumpy, with each scale on the tail being bulbous (DEHP 2016). It had reddish-brown fur with a paler underbelly, relatively small ears and a long tail with a prehensile tip (DEHP 2016).

Distribution

The species was only found on Bramble Cay, a small vegetated coral cay (a reef island composed of coral rubble and sand) roughly 340 m long by 150 m wide (4–5 ha), but subject to seasonal changes in both shape and size, located at the northern tip of the Great Barrier Reef in the Torres Strait (DEHP 2016). This made it Australia's most isolated species of mammal. Its distribution on the island was mostly associated with the 2.2 hectare vegetated area (Latch 2008). It has not been reported on other islands in the Torres Strait, despite some intensive surveys (Lee 1995; M. Turner pers comm, cited in Woinarski et al. 2014), but it is possible that it also occurs in nearby New Guinea approximately 50 km away (Latch 2008).

Limpus et al. (1983) reported that Bramble Cay is a highly dynamic island, and speculated that it could 'drop off the reef flat into deeper water' (Latch 2008). Its maximum elevation is 3 m (Elvish & Walker 1991), rendering it vulnerable to storm surges or tsunamis.

Relevant Biology/Ecology

The Bramble Cay Melomys was a nocturnal rodent that sheltered mostly in burrows, and under logs and debris (Limpus et al. 1983; Latch 2008). Its diet was poorly known. Latch (2008) reported that it frequently fed on the fleshy herb *Portulaca oleracea* (common purslane), and considered that the diet was probably entirely vegetarian; however, Ellison (1998) reported an account of it feeding on turtle eggs.

Dennis (2012) reported a strong female-biased sex ratio, and suggested an extended breeding season at least over the winter months (based on captures in July of pregnant and lactating females, juveniles and sub-adults).

The Bramble Cay Melomys coexisted with large numbers of shorebirds (noddies, terns and boobies) and nesting green turtles, but avoided areas where high densities of shorebirds occurred (DEHP 2016).

There is no published information on the life history of this species, but limited information for other *Melomys* suggests that longevity in the wild may have been at least two years (Watts & Aslin, 1981). Two years is taken here as the generation length.

Threats

Being confined to a single, very small and isolated location, the Bramble Cay Melomys was susceptible to a wide range of threats (Table 1). Available evidence indicates that the anthropogenic climate change-induced impacts of sea-level rise, coupled with an increased frequency and intensity of weather events that produced damaging storm surges and extreme high water levels, particularly during the decade 2004 to 2014, were most likely responsible for the extirpation of the species from Bramble Cay (DEHP 2016).

Table 1: Threats that have impacted the Bramble Cay Melomys in approximate order of severity of risk, based on available evidence

Number	Threat factor	Threat type and status	Evidence base
1.0	Habitat loss and degradation		
1.1	Severe storms and ocean inundation	known past	<p>There is well-documented evidence of erosion events associated with major storms (Latch 2008), and anecdotal evidence that some past storm surges have inundated much of the island (Leung pers comm, cited in Woinarksi et al. 2014).</p> <p>Turner & Batianoff (2007) predicted that ‘a severe cyclone may destroy all the vegetation on Bramble cay’, and ‘rising sea levels will erode away Bramble Cay causing extinction of the Bramble Cay Melomys’.</p> <p>The extent of herbaceous vegetation decreased dramatically during the 10-year period following 2004, due to repeated seawater penetration of the island’s interior (DEHP 2016).</p>
2.0	Invasive species		
2.1	Predation by non-native predators	known past	<p>There is largely unrestricted access to the island, which allowed for possible introduction of cats (<i>Felis catus</i>) or dogs (<i>Canis familiaris</i>) (Latch 2008). Anecdotal reports indicate at least some individuals were killed by domestic dogs that were released onto the island from visiting boats, and that the species was also hunted by Indigenous people who visited from PNG on a sporadic basis (DEHP 2016).</p>
2.2	Introduced competitors	suspected past	<p>Largely unrestricted access to the island allowed for possible introduction of black rats (<i>Rattus rattus</i>) or other rodents (Elvish & Walker 1991). Some individual introduced rats have been reported, without persistence (Latch 2008).</p>
2.3	Introduced plants	suspected past	<p>Largely unrestricted access to the island allowed for possible introduction of weeds (Latch 2008), which may have reduced habitat quality and/or food availability for this species.</p>
3.0	Poor health and disease		
3.1	Disease	suspected past	<p>Introduced rats may have contained novel diseases (Latch 2008).</p>
3.2	Loss of genetic diversity	suspected past	<p>Evidence of very low genetic diversity may have caused problems associated with inbreeding (Dennis & Storch 1998).</p>

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%
A1	Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.		(a) direct observation [except A3]
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.		(b) an index of abundance appropriate to the taxon
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]		(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
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.		(d) actual or potential levels of exploitation
			(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

based on any of the followin

Evidence:

In 1978, the population on Bramble Cay was estimated to comprise at most ‘several hundred individuals’ (Limpus et al. 1983). A formal population census of the Bramble Cay Melomys conducted in 1998 estimated the Cay’s population size to be about 93, based on the capture of 42 individuals (Dennis & Storch 1998). These results suggested there had been an ongoing decline in the abundance of the Bramble Cay Melomys. Subsequent trapping studies using the same methodology in 2002 and 2004 yielded only 10 and 12 individuals, respectively (Dennis 2012). The last individual was reported in 2009 (Gynther et al. 2016). Limited searches over 2009–2013 failed to record the species. A more substantial and comprehensive search of the small island in August–September 2014 (involving 900 small mammal trap-nights, 60 camera trap-nights and two hours of active daytime searches) was unsuccessful, and also found that almost all vegetation had been lost from the cay (Gynther et al. 2016).

Searches of other Torres Strait islands have failed to discover another population of the Bramble Cay Melomys.

It is almost certain that the species’ decline occurred due to ocean inundation of the low-lying cay, very likely on multiple occasions during the last decade, causing dramatic habitat loss and direct mortality of individuals (Gynther et al. 2016). Information on sea-level rise and an increased frequency and intensity of weather events, producing extreme high water levels and damaging storm surges in the Torres Strait region over the last decade, suggest human-induced climate change was the key factor responsible for the loss of the species (Gynther et al. 2016).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct** 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:

The extent of occurrence (EOO) and area of occupancy (AOO) were both estimated to be 0.05 km² (Woinarski et al. 2014). Using the 2x2 km grid cell method in the IUCN Red List Guidelines 2017 (IUCN Standards and Petitions Subcommittee 2017) this equates to an EOO and AOO of 4 km². The vegetation cover, and hence food resources, on Bramble Cay declined to almost zero by 2014 (Woinarski & Burbidge 2016). The species has only ever been reported from a single population. A continuing decline was observed in the extent of occurrence, area of occupancy, area and quality of habitat, and number of mature individuals (Woinarski & Burbidge 2016).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct** 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
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of			

Evidence:

A comprehensive targeted search in 2014 failed to find any individuals (Gynther et al. 2016). The number of individuals has declined from around 10 to zero over 2004–2014 (see Criterion 1).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct** 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:

A comprehensive targeted search in 2014 failed to find any individuals (Gynther et al. 2016).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct** 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:

No population viability analysis has been undertaken. The species is already considered to be extinct (Gynther et al. 2016; Woinarski & Burbidge 2016).

The data presented above appear to demonstrate that the species is **eligible for listing as Extinct** 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.

References cited in the advice

- Bryant LM, Donnellan SC, Hurwood DA & Fuller SJ (2011) Phylogenetic relationships and divergence date estimates among Australo-Papuan mosaic-tailed rats from the *Uromys* division (Rodentia: Muridae). *Zoologica Scripta* 40, 433–447.
- Dennis A (2012) Bramble Cay Melomys *Melomys rubicola*. In LK Curtis, AJ Dennis, KR McDonald, PM Kyne & SJS Debus (eds) *Queensland's threatened animals*. CSIRO Publishing, Collingwood. pp. 398–399.
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- Latch P (2008) *Recovery plan for the Bramble Cay Melomys Melomys rubicola*. Environmental Protection Agency, Brisbane.
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- Watts CHS & Aslin HJ (1981) *The Rodents of Australia*. Angus & Robertson, Sydney.
- Woinarski JCZ, Burbidge AA & Harrison PL (2014) *The action plan for Australian mammals 2012*. CSIRO Publishing, Collingwood.

Other sources cited in the advice

- Department of Environment and Heritage Protection (DEHP) (2016) *Bramble Cay Melomys*. Available on the Internet at: <http://www.ehp.qld.gov.au/wildlife/animals-az/index.html>.
- IUCN Standards and Petitions Subcommittee (2017) *Guidelines for Using the IUCN Red List Categories and Criteria*. Version 13. Prepared by the Standards and Petitions Subcommittee. Available on the Internet at: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>
- Woinarski J & Burbidge AA (2016) *Melomys rubicola*. In *The IUCN Red List of Threatened Species*. Version 2017-3. Available on the Internet at: <http://www.iucnredlist.org>.

Consultation questions

PART 1 – INFORMATION TO AID LISTING ASSESSMENT

1. Do you have any additional information in the **ecology or biology** of the species?
2. Can you provide any additional information or estimates on **longevity, average life span or generation length** for the species?
3. Do you have additional information to support an **estimate of the current population size** of mature adults of the species (national extent)?
4. Do you have additional information on **population trends** over 3 generations, or an historic population size for the species (national extent)?
5. Do you have additional information on **current range** (national extent) or **location of populations** for the species?
6. Can you provide additional information on any **change in range** or **location of populations**, or an **historic range** (national extent)?

PART 2 – INFORMATION FOR CONSERVATION ADVICE ON THREATS AND CONSERVATION ACTIONS

7. Do you further information on the historic, current or potential **threats** facing the species?
8. Do you have further information on current or potential **management actions** to support protection and recovery of the species?
9. Do you have further information on current or potential **monitoring or research activities** for the species?
10. Are you aware of **other knowledge** (e.g. traditional ecological knowledge) that may help better understand the threats and management actions to aid recovery of the species?
11. Are you aware of any **cultural importance or use** that the species has?
12. What **individuals or organisations** are currently, or potentially could be, involved in management and recovery of the species?

PART 3 – ANY OTHER INFORMATION

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