



Consultation Document on Listing Eligibility and Conservation Actions

Hipposideros semoni (Semon's leaf-nosed bat)

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

- 1) the eligibility of *Hipposideros semoni* (Semon's leaf-nosed bat) for inclusion on the EPBC Act threatened species list; 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.

This document contains draft information for your consideration of the eligibility of this species for listing and information associated with potential conservation actions for this species. To assist with the Committee's assessment, there are a series of specific questions which seeks your guidance.

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 April 2016.

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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 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 available on the Department's website 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.

Hipposideros semoni

Semon's leaf-nosed bat

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 *Hipposideros semoni* (Matschie 1903).

No subspecies are currently recognised. Semon's leaf-nosed bat is closely related to several *Hipposideros* species in northern Australia, such as *H. stenotis* (northern leaf-nosed bat) and in New Guinea (Hill 1963), such as *H. muscinus* (Fly River leaf-nosed bat). A current taxonomic study is comparing closely related forms in Australia and in New Guinea (K. Armstrong pers. comm., cited in Woinarski et al., 2014).

Species/Subspecies Information

Description

Semon's leaf-nosed bat is a small bat with a head to body length of approximately 40–50 mm and a weight of 6–10 g (Hall 2008). The fur is relatively long and has a ruffled appearance; it is dark smoky-grey in colour, though lighter on the belly (Churchill 1998, 2009). The wing membrane near the body is covered with whitish-brown hair (Hall 2008). The ears are particularly long and narrow, with an acute point (Churchill 1998).

The noseleaf is well developed, square-shaped and covers most of the muzzle. There are two wart-like protuberances – one in the centre and another on the posterior edge (Churchill 1998, 2009). The upper portion of the noseleaf is divided into four depressions and there are two supplementary leaflets under each side of the lower portion (Hall 2008). It is distinguished from *Hipposideros stenotis* (northern leaf-nosed bat) by having a longer central wart (Hall 2008).

Distribution

Semon's leaf-nosed bat occurs mainly in north-eastern Australia (along eastern Cape York Peninsula to Townsville), with the majority of records around Iron Range, Kulla, Oyala Thumotang and Cape Melville National Parks, and near Cooktown (Reardon et al., 2010). There is evidence for an isolated subpopulation further south at Kroombit Tops (south of Gladstone) (Schulz & de Oliveira 1995), and a possible unconfirmed record as far south as St. Mary's State Forest near Maryborough (de Oliveira & Pavey 1995). Beyond Australia, it is also known from a few records in New Guinea (Flannery 1990, 1995; Bonaccorso 1998).

Bonaccorso et al. (2008) reported that the range of the species has receded northwards considerably (by approximately 30 percent of its Australian range) over the last 60 years.

Relevant Biology/Ecology

Semon's leaf-nosed bat is an insectivorous bat that occurs mainly in rainforests, but has also been recorded from streams and rivers adjacent to rainforest (Reardon et al., 2010). A wide range of roost sites have been recorded, including in houses (Van Deusen 1975), abandoned buildings (Churchill 2009), caves (Thomson et al., 2001; Churchill 2009) and trees (Churchill 2009). Semon's leaf-nosed bat has short broad wings, and its flight is typically slow and

fluttering, usually within two metres of the ground (Van Deusen 1975; Hall 2008). Moths may comprise the main dietary item (Churchill 2009).

Semon's leaf-nosed bat is sexually dimorphic. Females are larger than males (Whybird et al., 1998) and echolocation call frequency varies between the sexes (de Oliveira & Schulz 1997; K. Armstrong pers. comm., cited in Woinarski et al., 2014). Males produce a constant frequency call of approximately 94 kHz and females produce a constant frequency call of approximately 74 kHz. Calls of this species have also been noted in the 83–85 kHz band. These characteristic differences may reflect or drive sexual differences in foraging and diet (O. Whybird pers. comm., cited in Woinarski et al., 2014; K. Armstrong pers. comm., cited in Woinarski et al., 2014).

Females give birth to a single young per year, around November (Churchill 2009). A generation length of 6–7 years is derived from a mean of age at sexual maturity (estimated at 1–2 years) and longevity (probably around 12 years), based on information for other *Hipposideros* species. No detailed information is available for this species.

Semon's leaf-nosed bat is difficult to catch while foraging as its slow flight and manoeuvrability allows it to avoid nets; however, it has a distinctive echolocation call.

Threats

Threats to Semon's leaf-nosed bat are outlined in the table below (Woinarski et al., 2014).

Threat factor	Consequence rating	Extent over which threat may operate	Evidence base
Disturbance, destruction or reduced accessibility to roost sites	Moderate	Minor	Thompson et al. (2001) regarded disturbance, destruction and reduced accessibility to roost sites by human visitation and mining a plausible threat to the species. This threat, however, has not been demonstrated.
Habitat loss and fragmentation	Moderate	Minor	Woinarski et al. (2014) consider habitat loss and fragmentation to be a possible threat to the species. This threat, however, has not been demonstrated.
Habitat change due to pastoralism	Minor	Moderate	Dennis (2012) considered habitat change as a result of pastoralism to be a possible threat to the species. This threat, however, has not been demonstrated.
Increased fire extent, frequency and intensity	Minor	Moderate	The species range is located over areas of differing fire regime. Dennis (2012) considered extensive, frequent and intense fires to be a possible threat to the species due the impacts on prey abundance. This threat, however, has not been demonstrated.
Predation by cats (<i>Felis catus</i>)	Minor	Minor	Woinarski et al. (2014) consider predation by cats at roost sites and roost entrances to be a possible threat to the species. This threat, however, has not been demonstrated.

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%
<div> <div> 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. </div> <div> <i>based on any of the following</i> <ul style="list-style-type: none"> (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 </div> </div>			

Evidence:

The Semon's leaf-nosed bat population may be declining according to Duncan et al. (1999), based in part on comparison of relative numbers reported in the 1990s and during surveys of the Cape York Peninsula in the 1940s and 1950s (Tate 1952). There are no data available on why a decline may have occurred (Dennis 2012). It was noted by T. Inkster (pers. comm., cited in Woinarski et al., 2014) that preliminary modelling has predicted that the species' preferred habitat (rainforest and riparian forest) is likely to reduce in area over the next 50 years, particularly in the south of its range.

Conversely, Reardon et al. (2010) noted that the species was regularly reported in their targeted searches of Cape York Peninsula; they consider that the species is relatively secure within its Cape York Peninsula range and the assumption of a decline may not be valid. In addition, rainforest in parts of the Iron Range area have expanded over recent decades due to the current fire regime (Russell-Smith et al., 2004).

Woinarski et al. (2014) consider that, if a decline in population size is occurring, it is likely to be at a rate of less than 30 percent over a 20 year period (approximately three generations).

The data presented above appear to demonstrate that 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 km²	< 5,000 km²	< 20,000 km²

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 is estimated at 54 162 km², and the area of occupancy estimated at 32 km². These figures are based on the mapping of point records from 1996 to 2016, obtained from state governments, museums and CSIRO. The extent of occurrence was calculated using a minimum convex hull, and the area of occupancy calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines 2014 (DotE 2015). Woinarski et al. (2014) considered that the AOO, which they estimated to be 108 km², is a significant under-estimate due to limited sampling across the occupied range, and may be around 2000 km².

Over the last 60 years, the range of the species in Australia has receded northwards by approximately 30 percent (Bonaccorso et al., 2008). The population may be declining (see Criterion 1). Woinarski et al. (2014) consider that the species is likely to have less than ten subpopulations.

The habitat for Semon's leaf-nosed bat may be fragmented, but it is not severely fragmented. There is no information to suggest there have been extreme fluctuations in the species distribution or abundance.

The data presented above appear to be insufficient to demonstrate if the species is 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 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			

Evidence:

There are no robust estimates of population size or the size of subpopulations. The current EPBC Act listing was based on a population size estimate of fewer than 2500 mature individuals but this is likely to be an underestimate (Reardon et al., 2010). Given the survey success at Iron Range and McIlwraith Range regions, it is likely that the species has a population greater than 2500, although it is not abundant (Reardon et al., 2010).

Woinarski et al. (2014) consider that the population size of Semon's leaf-nosed bat is likely to be greater than 10 000 mature individuals, and the largest subpopulation is likely to contain less than 1000 mature individuals. The population may be declining, but probably at a rate of less than 10 percent over a three generation period. There is no information to suggest there have been extreme fluctuations in the number of mature individuals.

The data presented above appear to be insufficient to demonstrate if the species is 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 4. Number of mature individuals			
	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

Woinarski et al. (2014) consider that the population size of Semon's leaf-nosed bat is likely to be greater than 10 000 mature individuals (see Criterion 3).

The information presented above appears to demonstrate that 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:

No population viability analysis has been undertaken.

There are insufficient data to demonstrate if the species is 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.

Consideration for delisting

Semon's leaf-nosed bat is currently listed as Endangered under the EPBC Act under Criterion 3. The assessment presented in this consultation document suggests the species may no longer be eligible to be listed under the EPBC Act as it may not satisfy the listing criteria in any category.

However, the species is data deficient. Robust estimates of area of occupancy and population size are unavailable, and population trends are unclear. It may have a limited area of occupancy, a limited or low population size, and the population may be declining. It is possible that the species may meet Criterion 2 or Criterion 3. Given the uncertainty in the assessment, there appears to be insufficient evidence to demonstrate that Semon's leaf-nosed bat is no longer eligible to be listed as Endangered under the EPBC Act.

Inclusion of Semon's leaf-nosed bat in the Endangered category is likely to be contributing to its survival, as the EPBC Act requires proponents to refer a proposed action for assessment if the action may have a significant impact on a listed species. Where necessary, the Department issues conditions requiring proponents to avoid, minimise or mitigate impacts on the species.

Semon's leaf-nosed bat is listed as Endangered under the Queensland *Nature Conservation Act* (1992). If delisted, the species will still be covered under state legislation. However, recovery actions under the *Recovery plan for cave-dwelling bats, Rhinolophus philippinensis, Hipposideros semoni and Taphozous troughoni 2001–2005* (Thompson et al., 2001), which was developed by the State of Queensland and adopted as a national recovery plan under the EPBC Act, may not continue. Actions consistent with the recovery plan have helped to clarify its distribution and status. Although it is unclear what impact the recovery plan has had on the survival of the species, without the continuation of research and monitoring activities the species will remain data deficient and may further decline. The recovery plan is scheduled to cease in 2017.

Conservation Actions

Recovery Plan

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

A recovery plan is currently in place. The *Recovery plan for cave-dwelling bats, Rhinolophus philippinensis, Hipposideros semoni and Taphozous troughoni 2001–2005* (Thompson et al., 2001) includes objectives to:

- establish the status of poorly known species and to identify appropriate species management units within two years of implementation of the plan
- gather the necessary biological data from current records and through new, targeted field work for the effective conservation management of the species
- implement conservation strategies or on-ground conservation works in priority sites where the species occur to mitigate identified threatening processes
- identify trends in the species' abundance at priority sites across their distributional ranges after the instigation of conservation strategies or on-ground conservation works

Previous and current studies, particularly regarding the biology of the species, have contributed towards meeting the objectives of the plan since its adoption (e.g. Reardon et al., 2010; Bonaccorso et al., 2008). However, further research is required to establish population trends, clarify threatening processes and develop appropriate management actions.

Primary Conservation Objectives

1. Assess distribution, population size and trends, and threats.

2. Manage threats to secure or increase overall population size.

Conservation and Management Priorities

There is no specific management targeted at this species. Parts of its range are in conservation reserves where some threats are managed. There has been some management of abandoned mines within the species' range (Thomson 2002), but such actions are constrained by limited information about the roost preferences and locations of this species.

Recommended conservation and management actions are outlined in the table below (Woinarski et al., 2014).]

Theme	Specific actions	Priority
Active mitigation of threats	Constrain actions that may lead to loss of critical roost sites	High
	If needed, stabilise roost sites; and constrain human visitation	Medium
	Implement fire management measures that benefit this species	Low-medium
	Implement broad-scale management of feral cats; or local-scale implementation at and around important subpopulations	Low
Captive breeding	Not applicable	-
Quarantining isolated populations	Not applicable	-
Translocation	Not applicable	-
Monitoring	Implement integrated monitoring program linked to assessment of management effectiveness	Medium
Community engagement	Involve Indigenous ranger groups in survey, monitoring and management	Medium

Survey and Monitoring priorities

Theme	Specific actions	Priority
Survey to define better distribution	Undertake fine-scale sampling to assess distribution and identify and circumscribe important subpopulations (or colonies) (and roost sites), and assess the population size of these	High
Establish or enhance monitoring program	Design an integrated monitoring program across its range, and at known roost sites	Medium -high

Information and Research priorities

Theme	Specific actions	Priority
Assess relative impacts of threats	Assess the structural viability and potential threats (particularly human visitation) to all known roost sites	Medium
	Identify the population-level responses to a range of fire regimes, and model population viability across all fire scenarios	Medium
	Assess abundance of feral cats in the range of this species, and the impact of predation	Low

	on population viability	
Assess effectiveness of threat mitigation options	Assess options for gating or other management of roost sites	Medium
	Assess efficacy and impacts of management options to reduce fire incidence, extent and intensity	Medium
	Assess effectiveness of options for broad-scale control of feral cats; or of local scale control at sites with important populations	Low
Resolve taxonomic uncertainties	Establish genetic structuring across subpopulations to identify extent of movement of individuals, and to identify populations that may be most genetically distinctive	Medium
Assess habitat requirements	Characterise roost (and maternity) site requirements	Medium
	Investigate seasonal and spatial patterning of foraging habitat use (of both sexes)	Low
Assess diet, life history	Assess the extent to which food availability may be affected by fire regimes	Medium
	Investigate key components of diet (for both sexes)	Low

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Other sources cited in the advice

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Consultation questions

1. Can you provide any additional or alternative references, information or estimates on longevity, average life span and generation length for the species?
2. Can you provide any information regarding the general requirements for recruitment?
3. Has the survey effort for this species been adequate to determine its national adult population size?
4. Do you accept the estimate provided of the total population size of the species?
5. Can you provide any additional data on the extent of decline in the species' total population size over the last approximately 20 years (i.e. three generations)?
6. Does the information consider the entire geographic extent and national extent of the species?

7. Has the survey effort for this species been adequate to determine its national distribution?
8. Is the distribution as described valid? If not, can you please provide an estimate or additional information on the current geographic distribution?
9. Do you agree that the way the current extent of occurrence and/or area of occupancy have been estimated is appropriate?
10. Do you agree that the threats listed are correct and that their effect on the species is significant?
11. To what degree are the identified threats likely to impact on the species in the future?
12. What threats are impacting on different subpopulations, how variable are the threats and what is the relative importance of the different subpopulations?
13. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?
14. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?
15. Can you provide additional data or information relevant to this assessment?