Australian Government
Department of the Environment

Consultation Document on Listing Eligibility and Conservation Actions

Sminthopsis douglasi (Julia Creek dunnart)

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

1) the eligibility of *Sminthopsis douglasi* (Julia Creek dunnart) 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.

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 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.

Sminthopsis douglasi

Julia Creek dunnart

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 are 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 *Sminthopsis douglasi* (Archer 1979).

This species was first recognised and described relatively recently (1979). No subspecies are recognised.

Species/Subspecies Information

Description

The Julia Creek dunnart is the largest species of *Sminthopsis* found in Australia, with a head and body length of 110−135 mm and a weight of 40−70 g. The tail is long, being just slightly shorter than the head and body length, and tapers slightly towards the tip. Its fur is a grey-speckled brown above and buff-white below, and rufous on its cheeks and at the base of the ears. Like the stripe-faced dunnart (*Sminthopsis macroura*) it has a prominent facial stripe which runs from the nose to the top of the head, and when in good condition, a tail that is fattened at the base. However, it can be distinguished by the dark hairs found on the tip of the tail, upper-outer edge of the ears, and in a ring around the eyes (Woolley 2008).

Distribution

The Julia Creek dunnart is endemic to north-western Queensland, where it occurs in the Mitchell Grass Downs and Desert Uplands bioregions. Its known range has increased substantially with more recent surveys (Kutt 2003), and it is now known from at least 25 locations (Qld DERM 2009; Woolley 2009) across an extent of occurrence of about 60 000 km^2 (Qld DERM 2009). Subsequent new records include Kynuna Station (in 2009) and Mt Margaret Mine area near Cloncurry in 2012 (an extension to the west of the known range) (P. Woolley pers. comm., cited in Woinarski et al., 2014). Its potential distribution was modelled by Smith et al. (2006).

Prior to 1990, the species was only known from four museum specimens lodged between 1911 and 1972 (Lundie-Jenkins & Payne 2000), all from the vicinity of Julia Creek and Richmond in north-west Queensland (Archer 1979; Woolley 2008). In 1990, a new survey program began and revealed a number of new specimens from owl pellets (i.e. the indigestible remains of an owl's prey that are disgorged as pellets) and cat (*Felis catus*) kills. In 1991 and 1992, the first live specimens were caught (including one rescued from a cat) (Qld DEHP 2013).

Relevant Biology/Ecology

The Julia Creek dunnart is a nocturnal, terrestrial marsupial. It is closely associated with tussock grasslands on cracking clay soils, with habitat quality associated particularly with increasing densities of cracks and holes, and with the extent and density of grass cover. During the day it shelters within cracks in the soil (during dry periods), or under vegetation (after rain periods, when soil cracks close) (Qld DERM 2009). It is mainly insectivorous (consuming particularly crickets, spiders and cockroaches), but also feeds on some reptiles (Qld DERM 2009). Home

range size has been reported to vary from 0.25 to 7 ha (Mifsud 1999), with males generally more mobile with larger home ranges than females (Woolley 2008).

A very high proportion of its relatively small range occurs in lands managed for intensive grazing by sheep and cattle, and this pressure probably reduces habitat suitability.

Females can raise two litters per year of up to eight young within one season, with reproduction peaking in spring-summer (Mifsud 1999; Woolley 2008). Sexual maturity is reached in 17-31 weeks (with males maturing later than females), and longevity is 2-3 years (Woolley 2008; Qld DERM 2009), so generation length is assumed to be 1-2 years. *Sminthopsis* species are considered a 'boom or bust' species, being subjected to periodical fluctuations in population associated with seasonal changes (Qld DERM 2013).

Threats

Threats to the Julia Creek dunnart are outlined in the table below (Woinarski et al., 2014).

Threat factor	Consequence rating	Extent over which threat may operate	Evidence base
Predation by feral cats	Severe	Entire	'Cats have been shown to prey heavily' on this species (Lundie-Jenkins & Paine 2000; Kutt 2003; Burnett & Winter 2008; Mifsud & Woolley 2012), and numbers increased following control of feral predators (Mifsud 1999). Mifsud & Woolley (2012) reported 18 Julia Creek dunnarts in stomach contents of 199 sampled feral cats in the range area for this species.
Predation by foxes	Moderate	Entire	Recognised as a threat (Burnett & Winter 2008), and some direct evidence of predation (Kutt 2003), but none reported in stomach contents of 57 foxes sampled by Mifsud and Woolley (2012)
Habitat degradation and resource depletion due to livestock and feral herbivores	Moderate	Large	There is some, but varied, correlative evidence (Lundie-Jenkins & Paine 2000; Smith et al., 2007). Much of its habitat is intensively grazed by sheep and cattle.
Habitat change due to weed invasion	Moderate	Moderate	There has been wholesale change in habitat structure and suitability associated with the spread of prickly acacia (*Acacia nilotica*) and other woody weeds (Lundie-Jenkins & Paine 2000).

Increased fire frequency and intensity	Moderate	Moderate	There is some experimental evidence, suggesting mostly increased predation pressure after fire (Qld DERM 2009). Dunnarts can survive direct effects of fire if there is suitable habitat to provide protection from predators; impacts of fire depend on the timing and severity of the burn (Qld DEHP 2013).

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.

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

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

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

based on any of the followin

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

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

(d) actual or potential levels of exploitation

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

Evidence:

There is limited knowledge of the population size and population trends of this species. Some monitoring of Julia Creek dunnarts has been conducted at several sites (Toorak Research Station, Bladensburg National Park, Proa/Yorkshire Downs and Moorrinya National Park), however the 'consistency and frequency of this monitoring has varied considerably due to changes in staffing and funding available' (Qld DERM 2009). Given the typically low rates of detection, the statistical power of such irregular monitoring is also likely to be low. This problem may be magnified by the likely fluctuations in abundance in association with rainfall patterning, such that the detection of longer-term trends in population size may require intensive sampling over many years.

Burnett and Winter (2008) considered that its population size was declining, but that 'little is known about its population trend. It is unlikely to be declining at the rate required to qualify for listing in a threatened category, but it might be nearly there'. Ongoing decline (or maintenance of populations at levels lower than carrying capacity) is likely due to the range-wide operation of many threats (notably introduced predators and reduced habitat quality due to livestock).

Woinarski et al. (2014) suspect that the population size is declining, but at a rate less than 30 percent over a 10 year period.

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 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	**Endangered Restricted**	**Vulnerable Limited**
B1. Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2. Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions 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 Julia Creek Dunnart was thought to have a very restricted distribution, however more recent records have considerably extended the known range. The extent of occurrence is estimated at 73 188 km^2, and the area of occupancy estimated at 220 km^2. These figures are based on the mapping of 72 point records from 1996 to 2016, obtained from state governments, museums and CSIRO. The EOO was calculated using a minimum convex hull, and the AOO calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines 2014 (DotE 2015). Woinarski et al. (2014), which estimated the AOO at 164 km^2, considered this to be a significant underestimate due to limited sampling across the occupied range, but that the AOO was likely to be 'not appreciably >2000 km^2.

The species occurs in at least 25 locations (Qld DERM 2009; Woolley 2009) and is not severely fragmented. There is evidence of some, but not extreme, fluctuations in population numbers. A continuing decline in habitat quality and number of individuals is suspected.

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 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	**Very high rate 25% in 3 years or 1**	**High rate 20% in 5 years or 2**	**Substantial rate 10% in 10 years or 3**

	max. of 100 years in future)	**generation (whichever is longer)**	**generation (whichever is longer)**	**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:

There are no robust estimates of population size, nor that of most subpopulations. Most sources consider it scarce and patchily distributed, but this assessment may be substantially influenced by low detectability (Kutt 2003). Burnett and Winter (2008) and Woolley (2008) considered that the Julia Creek Dunnart was rare. Mifsud (1999) and Mifsud and Woolley (2012) reported capture of 100 individuals from 65 500 trap-nights (success rate of 0.15%) across four study sites and 3 years (1995-97). Woinarski et al. (2014) suspect that the number of mature individuals is 'not substantially >10 000,' and that the largest subpopulation 'probably contains >1000 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) suspect that the number of mature individuals is 'not substantially >10 000,' and that the largest subpopulation 'probably contains >1000 individuals'.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion, as it is unlikely that the number of mature individuals is less than 1000. 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**	**≥ 20% in 20 years or 5 generations, whichever is longer**	**≥ 10% in 100 years**

	(100 years max.)	(100 years max.)	

Evidence:

A population viability analysis appears not to have been undertaken, and 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

The Julia Creek dunnart is currently listed as Endangered under the EPBC Act. 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 population size and population trends of this species are poorly known. It may be rare, or more common due to difficulties in detectability. The population is suspected to be declining due to current and ongoing threats from feral cats, foxes and habitat degradation. It is possible that the species may meet Criterion 3. Given the uncertainty in the assessment and the suspected population trajectory, there appears to be insufficient evidence to demonstrate that the Julia Creek dunnart is no longer eligible to be listed as Endangered under the EPBC Act.

Inclusion of the Julia Creek dunnart 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.

The Julia Creek dunnart 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 the Julia Creek dunnart* (Sminthopsis douglasi) (Qld DERM 2009), 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 resulted in improved knowledge of the species and increased protection of some populations and habitat (Lundie-Jenkins 2012). Without the continued implemention of these recovery actions, the species may further decline. The recovery plan is scheduled to cease in 2020.

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. There have been two recovery plans developed for the Julia Creek dunnart (Lundie-Jenkins & Payne 2000; Qld DERM 2009). The level of implementation and success of the first plan was reviewed in the subsequent plan, with notable outcomes relating to some research activities (assessment of threats and biology), habitat modelling, some limited monitoring, management of some threats, habitat protection, and community involvement (Lundie-Jenkins 2012).

Key actions in the most recent recovery plan include:

- conduct surveys to clarify the extent of the species distribution;
- continue and expand population monitoring programs;
- encourage landholders to protect and manage key sites;

- integrate Julia Creek dunnart habitat into local government Stock Route Network Management Plans;
- continue and expand implementation of pest animal and plant control programs;
- investigate interactions between predators, water sources and grazing management;
- investigate interactions with sympatric species of small mammals; and
- conduct media campaigns and continue to produce/distribute educational material.

There has been limited implementation and success of this second plan.

Primary Conservation Actions

1. Manage threats to secure or increase overall population size.
2. Maintain viable populations at all known localities.

Conservation and Management Priorities

The Julia Creek dunnart is present in two conservation reserves, Bladensburg National Park and Moorrinya National Park (Qld DERM 2009), where it is protected from some threats. The species has also been recorded in Julia Creek Aerodrome, and a predator-proof fence was erected there (encompassing an area of 250 ha) in 2008 for its conservation (Qld DERM 2009). Twenty captive-bred dunnarts were released at this site in 2007 (Lundie-Jenkins 2008), and a further 22 released at this site in 2008 (Qld DEHP 2013). There is ongoing management of some woody weeds, and community involvement in some management (Lundie-Jenkins 2012).

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

Theme	Specific actions	Priority
Active mitigation of threats	Implement control mechanisms for introduced predators (especially feral cats), that minimise adverse impacts upon this species	High
	Constrain grazing by livestock and feral herbivores to within acceptable limits in and around important subpopulations	Medium-high
	Undertake landscape-scale fire management, to increase heterogeneity and decrease incidence of frequent extensive and intense fire; Qld DERM (2009) recommends some areas should be burnt every 4-8 years at Moorrinya National Park	Medium
	Control or eradicate woody weeds in and around important subpopulations	Medium
Captive breeding	Maintain a captive breeding colony	Low-medium
Quarantining isolated populations	N/a	
Translocation	Reintroduce to parts of its former range, once threat management is effective	Low-medium
Community engagement	Seek conservation covenants on private land holding important subpopulations	Medium-high

Survey and Monitoring priorities

Theme	Specific actions	Priority
Survey to better define distribution	Refine sampling methodologies to more reliably, cost-effectively and consistently detect the species (note that recent studies have examined occurrence in	High

	owl pellets and cat and fox stomachs as an effective means of indicating distributional patterns: Woolley 2009; Mifsud & Woolley 2012)	
	Assess the population size (or relative abundance) of all subpopulations, and then prioritise subpopulations (or meta-populations) for management focus	Medium-high
	Undertake a targeted survey of all suitable habitat within the species' range	Low-medium
Establish or enhance monitoring program	Design an integrated monitoring programs across subpopulations	Medium-high
	Implement an integrated monitoring program linked to assessment of management effectiveness	Medium-high
	Monitor the abundance of introduced predators at key subpopulations, in response to management actions	Medium-high
	Monitor the incidence of fire, and vegetation response, at key subpopulations	Low-medium

Information and Research priorities

Theme	Specific actions	Priority
Assess relative impacts of threats	Assess the impacts of introduced predators (under different densities and seasonal conditions)	Medium-high
	Assess the impacts of livestock and feral herbivores, and develop thresholds for safe grazing pressure	Medium-high
	Assess the impacts of fire, and identify a preferred fire regime	Medium
Assess relative effectiveness of threat mitigation options	Assess the efficacy of a range of management regimes for introduced predators	Medium-high
	Assess the efficacy of a range of management regimes for woody weeds	Low-medium
Resolve taxonomic uncertainties	N/a	
Assess habitat requirements	N/a	
Assess diet, life history	N/a	
Undertake research to develop new or enhance existing management mechanisms	Develop broad-scale, targeted feral cat control technology	Medium

References cited in the advice

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Woinarski, J. C. Z., Burbidge, A. A., & Harrison, P. L. (2014). *The action plan for Australian mammals 2012*. CSIRO Publishing, Collingwood.

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Woolley, P. A. (2009). The Julia Creek dunnart and other prey of the barn owl in Mitchell grass downs of north-western Queensland. *Memoirs of the Queensland Museum – Nature 55*, 107-117.

Other sources cited in the advice

Queensland Department of Environment and Heritage Protection (Qld DEHP) (2013). *Julia Creek dunnart*. Viewed 5 February 2016. Available on the internet at: https://www.ehp.qld.gov.au/wildlife/threatened-species/endangered/endangered-animals/julia_creek_dunnart.html

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 km^2) 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?