



Consultation Document on Listing Eligibility and Conservation Actions

***Sphaerolobium acanthos* (Grampians globe-pea)**

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

- 1) the eligibility of *Sphaerolobium acanthos* (Grampians globe-pea) 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.

Draft information for your consideration of the eligibility of this species for listing as Critically Endangered starts at page 3 and information associated with potential conservation actions for this species starts at page 8. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 12.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Terrestrial 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 Monday 1 August 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.

Sphaerolobium acanthos

Grampians globe-pea

Taxonomy

Conventionally accepted as *Sphaerolobium acanthos* Crisp.

Species Information

Description

Sphaerolobium acanthos (Grampians globe-pea) is an erect, perennial, wiry shrub and is a member of the family Fabaceae. The plant grows to 1 m tall, has rigid stems and branches with rough surfaces, and has numerous spiny branchlets. The leaves are scattered to semi-whorled, slender and tapering, and 2-3 mm long. The leaves are easily detached and shed at an early stage so that the plant appears leafless. One to two flowers occur on short stalks which occur on axillary positions along the branchlets. The plant flowers in summer (November – January) and its petals are yellow, orange or reddish-brown and around 7-7.5 mm long. It fruits in January and February and its pods are approximately 4.5 mm long and 3.5 mm wide. Each pod contains one to two seeds, which are approximately 1.5 mm in length (Crisp 1994; Jeanes 1996).

Distribution

The Grampians globe-pea is endemic to the Grampians National Park in western Victoria, which is managed by Parks Victoria. It has only been recorded in the Halls Gap – Mt William area and the Victoria Valley (Crisp 1994; Jeanes 1996). The Grampians globe-pea is found in sclerophyll forest, woodland and heathland where it has been recorded on lower slopes, gullies and near streams (Crisp 1994; Jeanes 1996; SAC 2014). This species occurs on tracksides and roadsides (SAC 2014).

At the time of the Victorian Scientific Advisory Committee's assessment of the species in 2013 the species was found in three small, disjunct populations with a total population size of fewer than 50 individual plants (SAC 2014). Herbarium records indicate the species was once more widespread throughout the park (ALA 2016) and SAC (2014) notes that there were five known populations in 1949. Following further survey effort in 2015 a new population that contained six individual plants was found, as well as an additional 30 plants at a known population (Reiter pers. comm., 2016). Therefore in 2015 the total population size was estimated to be fewer than 70 individual plants across four populations.

The area of occupancy (AOO) of the Grampians globe-pea is estimated to be 20 km² and the extent of occurrence (EOO) is estimated to be 86 km² (Department of the Environment 2016).

Relevant Biology/Ecology

The Grampians globe-pea is likely to be an obligate seeding plant, where the adult plants are killed by fire but the fire acts as a cue for seed germination (Reiter pers. comm., 2016). In early 2014 a bushfire swept through the northern end of the Grampians National Park (Parks Victoria 2016). This bushfire went through an area where one population of the Grampians globe-pea is known to occur but the outcome of the fire on this population is unknown. Another significant fire passed through the Grampians National Park in 2006, the effect of which upon the Grampians globe-pea is unknown. At two populations, no recruitment was observed during surveys undertaken in 2011, 2013 and 2015 (Reiter pers. comm., 2016; SAC 2014).

Reiter et al., (2004) found that the Grampians globe-pea is susceptible to infection by *Phytophthora cinnamomi*. The risk of extinction from infection, which was calculated using information on susceptibility, presence of the pathogen and proximity of the species to roads and tracks, indicated a low to moderate risk of extinction for the Grampians globe-pea as a result of infection by *P. cinnamomi* (Reiter et al., 2004).

The method for pollination for the Grampians globe-pea is not known, however members of the genus *Sphaerolobium* in Western Australia are pollinated by insects (Western Australian Herbarium 2008) and therefore it is likely this species is also insect pollinated. Without genetic data it is not possible to assess whether gene flow is occurring between populations. Seed has been collected from all populations of the Grampians globe-pea except for one and have been stored for long term conservation (Reiter pers. comm., 2016). An ex-situ collection has been established at the Royal Botanic Gardens Victoria using material from one population (Reiter pers. comm., 2016).

Threats

Table 1 – Threats impacting the Grampians globe-pea in approximate order of severity of risk, based on available evidence.

Threat factor	Threat type	Threat status	Evidence base
Invasive species			
Grazing by introduced herbivores, including goats and deer	known	current	Grazing by feral goats (<i>Capra hircus</i>) and deer (family Cervidae) is a significant threat to the Grampians globe-pea. At one site grazing on the Grampians globe-pea by goats was so bad that some of the plants had been eaten to a nub and no fruit was setting (Reiter pers. comm., 2016). This may lead to a depletion of the soil seed bank. Goats and deer occur within the Grampians National Park and graze on native vegetation, thereby preventing regeneration (Parks Victoria 2003).
Disease			
Disease caused by <i>Phytophthora cinnamomi</i>	known	current	Infection by <i>Phytophthora cinnamomi</i> is a significant threat to the Grampian's globe-pea. The species is susceptible to infection by <i>P. cinnamomi</i> (Reiter et al., 2004) and <i>P. cinnamomi</i> is present and spreading naturally in the Grampians National Park (Parks Victoria 2003; SAC 2014). Vegetation in the area, including the Grampians globe-pea, is showing signs of dieback and the cause may be <i>P. cinnamomi</i> (SAC 2014).
Fire			
Season, severity and frequency	potential	future	As an obligate seeding species, the soil seed bank would be rapidly depleted if fires occur in the wrong season, before juvenile plants reach maturity and replenish the soil seed bank, are too severe or are too frequent.
Habitat loss and fragmentation			
Habitat loss	suspected	past	Herbarium records indicate that one population of the Grampians globe-pea occurred on land that is now the site of the Halls Gap Caravan Park. It is almost certain this population is now extinct (SAC 2014).
Track and road maintenance	potential	future	The populations occur in the vicinity of roads and tracks within the Grampians National Park (SAC 2014). Maintenance of these roads and tracks may cause the loss, degradation or fragmentation of habitat for the Grampians globe-pea.

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.		
	<i>based on any of the following</i>		
	(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:

In 2015 there were fewer than 70 individual plants of the Grampians globe-pea in the wild. The number of populations has decreased from five separate populations to three, with a new population discovered in 2015. However, the associated decrease in the number of individual plants is unknown. The generation length of the Grampians globe-pea is unknown.

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:

According to the Department, the EOO of the Grampians globe-pea across its range is 86 km². Therefore the EOO is *very restricted* (< 100km²). The AOO of the species across its range, based on 2 x 2 km grids, is 20 km². Therefore the AOO is *restricted* (<500 km²).

In 2015 there were fewer than 70 individual plants of the Grampians globe-pea in the wild found across four populations (≤ 5). There is a projected decline in the number of mature individuals due to grazing by goats and deer and the presence of *P. cinnamomi* in the Grampians National Park.

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

Evidence:

The population size for the Grampians globe-pea is *very low*, with fewer than 70 individual plants in the wild in 2015, found across four populations. The number of individuals in each population is ≤ 50.

There is a projected decline in the number of mature individuals due to grazing by goats and deer and the presence of *P. cinnamomi* in the Grampians National Park.

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

Evidence:

The population size for the Grampians globe-pea is *very low* with fewer than 70 individual plants in the wild in 2015. This estimate is based on survey work carried out at extant and previously known locations of the species between 2000 and 2015.

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

Population viability analysis appears not to have 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.

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.

Primary Conservation Actions

1. Minimise the impact of feral herbivores.
2. Minimise the spread of *P. cinnamomi* into the habitat of the Grampians globe-pea and mitigate the impact of *P. cinnamomi* if it is found there.

Conservation and Management Priorities

Invasive species

- Manage sites to identify, control and reduce the spread of feral herbivores, such as goats and deer, within the Grampians National Park.
- Construct fencing to exclude feral herbivores, such as goats and deer, from populations of the Grampians globe-pea where grazing by feral herbivores is identified to be a significant issue to recruitment and/or mortality.

Disease

- Minimise the spread of *P. cinnamomi* to uninfected habitat of the Grampians globe-pea within the Grampians National Park by modifying human activities via education, restricting access to sites and, when access is necessary, deploying and enforcing hygiene procedures in line with the 'Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*' (Department of the Environment 2014) and 'Victoria's Public Land *Phytophthora cinnamomi* Management Strategy' (DSE 2008).
- Monitor the Grampians globe-pea and nearby plants for the presence of *P. cinnamomi* and other *Phytophthora* species. If presence is detected, undertake measures to manage its impact at these infested sites through the use of phosphate treatments, fumigants, specific vegetation destruction and containment barriers, in line with the 'Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*' (Department of the Environment 2014) and 'Victoria's Public Land *Phytophthora cinnamomi* Management Strategy' (DSE 2008).

Seed collection, propagation and other ex situ recovery action

- Maintain the population in cultivation at the Royal Botanic Gardens Victoria and establish other populations in institutions such as the Australian National Botanic Gardens.
- Undertake appropriate seed collection from all natural populations to manage the risk of losing genetic diversity. Store seed at appropriate institutions, including the Victorian Conservation Seedbank, Royal Botanic Gardens Melbourne and undertake tests to determine viability of stored seed.
- Establish additional plants within the Grampians National Park, as well as in other identified suitable secure habitat. Implement the national translocation protocols of Vallee et al. (2004).

Fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the Grampians globe-pea, that they support rather than degrade the habitat necessary for the species, that they do not promote the invasion of exotic species, and that they do not increase impacts of grazing.
- Physical damage to the habitat and individuals of the Grampians globe-pea must be avoided during and after fire operations.
- Fire management authorities and Parks Victoria should use suitable maps and install field markers to avoid damage to the Grampians globe-pea.
- Avoid uses of prescribed fire between mid autumn and late spring.
- Avoid the use of managed fire for research and other activities that impact upon the persistence of the population unless there is evidence to show the impact would have a positive and enduring effect on the species persistence.

Habitat loss, disturbance and modifications

- Ensure land managers are aware of the species' location and provide protection measures against key and potential threats to the species' habitat, including road and track maintenance within the Grampians National Park.

Stakeholder Engagement

- Raise awareness with visitors to the Grampians National Park of the presence of the Grampians globe-pea and the threat to the species from infection by *P. cinnamomi*. Ensure visitors are aware of and follow hygiene protocols.

Survey and Monitoring priorities

- Conduct targeted surveys throughout the range of the Grampians globe-pea to better define its distribution and abundance. Accurately identify potentially suitable habitat and undertake survey work to locate and map additional populations.
- Establish and maintain a monitoring programme based on these data to:
 - determine trends in population size and distribution, mortality and timing of life history stages;
 - determine threats and their impacts; and
 - monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Monitor the size and structure and reproductive status of populations at different stages in the fire cycle, taking opportunities to monitor after planned and unplanned fires (where they occur) and improve understanding of the fire response of the species.
- Precise fire history records must be kept for the habitat and extant populations (confirmed and suspected) of the Grampians globe-pea.

Information and Research priorities

- Assess the species' ecological requirements relevant to the persistence of the species, including investigate regenerative status, age of maturity and senescence, generation length, seed bank status and longevity, fecundity and recruitment levels.
- Determine more precisely the germination requirements for the species. Determine the seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli. Undertake vegetative propagation trials to determine the requirements for successful establishment, including the role of fire season and severity on establishment. Implement an annual census to monitor emergence and re-sprouting success.
- Improve understanding of the mechanisms of response to different fire regimes and identify appropriate fire regimes for conservation of the Grampians globe-pea by undertaking appropriately designed experiments in the field and/or laboratory. Fire trials should only be undertaken as a last resort when all other means of regeneration of the species has been investigated and, in addition, all weed management and fire impacts including the timing of fire impacts are fully understood.
- Investigate options for linking, enhancing or establishing additional populations.

References cited in the advice

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<http://bie.ala.org.au/species/urn:lsid:biodiversity.org.au:apni.taxon:695346>.
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http://parkweb.vic.gov.au/data/assets/pdf_file/0003/621246/Grampians-National-Park-Update.pdf.

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Western Australian Herbarium (2008). FloraBase-the Western Australian Flora: *Sphaerolobium* Sm. Available on the Internet at:
<https://florabase.dpaw.wa.gov.au/browse/profile/21617>.

Collective list of questions – your views

(Note: The listing guidelines for criterion 1 consider decline over a period of three generation lengths or 10 years, whichever is longer. Please only answer questions 5 and 6 if you know the generation length for this species and can determine which is longer).

Biological information

1. Can you provide any additional or alternative references, information or estimates on longevity, average life span and generation length?
2. Can you provide any information regarding the general requirements for recruitment?

Population size

3. Has the survey effort for this species been adequate to determine its national adult population size? If not, please provide justification for your response.
4. Do you consider the way the population size has been derived to be appropriate? Are there any assumptions and unquantified biases in the estimates? Did the estimates measure relative or absolute abundance? Do you accept the estimate of the total population size of the species? If not, please provide justification for your response.

Evidence of total population size change

5. If you know the generation length for the Grampians globe-pea, are you able to provide an estimate of the total population size during the period either 10 years ago or three generations ago? Please provide justification for your response.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species numbers, and also choose the level of confidence you have in this estimate.

Number of mature individuals is estimated to be in the range of: <input type="checkbox"/> 1–50 <input type="checkbox"/> 51–250 <input type="checkbox"/> 251–1000 <input type="checkbox"/> >1000 <input type="checkbox"/> >10 000
Level of your confidence in this estimate: <input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much information to go on <input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence <input type="checkbox"/> 51–95% - reasonably certain, information suggests this range <input type="checkbox"/> 95–100% -high level of certainty, information indicates quantity within this range <input type="checkbox"/> 99–100% - very high level of certainty, data are accurate within this range

6. If you know the generation length for the Grampians globe-pea, are you able to comment on the extent of decline in the species' total population size over the last time period equating to three generations? Please provide justification for your response.

If, because of uncertainty, you are unable to provide an estimate of decline, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of decline, and also choose the level of confidence you have in this estimated range.

Decline estimated to be in the range of:

- 1–30% 31–50% 51–80% 81–100% 90–100%

Level of your confidence in this estimated decline:

- 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- 31–50% - more than a guess, some level of supporting evidence
- 51–95% - reasonably certain, suggests this range of decline
- 95–100% -high level of certainty, information indicates a decline within this range
- 99–100% - very high level of certainty, data are accurate within this range

7. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

Current Distribution/range/extent of occurrence, area of occupancy

8. Does the information consider the entire geographic extent and national extent of the species? If not, please provide justification for your response.
9. Has the survey effort for this species been adequate to determine its national distribution? If not, please provide justification for your response.
10. Is the distribution as described valid? If not, please provide justification for your response and provide alternate information.
11. Do you agree that the way the current extent of occurrence and/or area of occupancy has been estimated is appropriate? Please provide justification for your response.

Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the extent of occurrence and/or area of occupancy.

If, because of uncertainty, you are unable to provide an estimate of extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of extent of occurrence, and also choose the level of confidence you have in this estimated range.

Extent of occurrence is estimated to be in the range of:

- <100 km² 100 – 5 000 km² 5 001 – 20 000 km² >20 000 km²

Level of your confidence in this estimated extent of occurrence

- 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- 31–50% - more than a guess, some level of supporting evidence
- 51–95% - reasonably certain, data suggests this range of decline
- 95–100% -high level of certainty, data indicates a decline within this range

99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of area of occupancy, and also choose the level of confidence you have in this estimated range.

Area of occupancy is estimated to be in the range of:

<10 km² 11 – 500 km² 501 – 2000 km² >2000 km²

Level of your confidence in this estimated extent of occurrence:

- 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- 31–50% - more than a guess, some level of supporting evidence
- 51–95% - reasonably certain, data suggests this range of decline
- 95–100% -high level of certainty, data indicates a decline within this range
- 99–100% - very high level of certainty, data is accurate within this range

Past Distribution/range/extent of occurrence, area of occupancy

12. Do you consider that the way historical distributional information has been estimated is appropriate? Please provide justification for your response?

Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the former distribution of the species, including estimates of extent of occurrence and/or area of occupancy.

If, because of uncertainty, you are unable to provide an estimate of past extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past extent of occurrence, and also choose the level of confidence you have in this estimated range.

Past extent of occurrence is estimated to be in the range of:

<100 km² 100 – 5 000 km² 5 001 – 20 000 km² >20 000 km²

Level of your confidence in this estimated extent of occurrence

- 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- 31–50% - more than a guess, some level of supporting evidence
- 51–95% - reasonably certain, data suggests this range of decline
- 95–100% -high level of certainty, data indicates a decline within this range
- 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of past area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges

suggested in the table below of ranges of past area of occupancy, and also choose the level of confidence you have in this estimated range:

Past area of occupancy is estimated to be in the range of: <input type="checkbox"/> <10 km ² <input type="checkbox"/> 11 – 500 km ² <input type="checkbox"/> 501 – 2000 km ² <input type="checkbox"/> >2000 km ²
Level of your confidence in this estimated extent of occurrence: <input type="checkbox"/> 0–30% - low level of certainty/ a bit of a guess/ not much data to go on <input type="checkbox"/> 31–50% - more than a guess, some level of supporting evidence <input type="checkbox"/> 51–95% - reasonably certain, data suggests this range of decline <input type="checkbox"/> 95–100% -high level of certainty, data indicates a decline within this range <input type="checkbox"/> 99–100% - very high level of certainty, data is accurate within this range

Change in status/rate of change

13. Is the information used to identify the nationally threatened status of the species robust? Have all the underlying assumptions been made explicit? Please provide justification for your response.

General

14. Can you provide additional data or information relevant to this assessment?
15. Have you been involved in developing this nomination? If so in what capacity?

Threats

16. Do you agree that the threats listed are correct and that their effect on the species is significant?
17. To what degree are the identified threats likely to impact on the species in the future?
18. What threats are impacting on different populations, how variable are the threats and what is the relative importance of the different populations? Please provide evidence and background information.
19. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this species at any stage of its life cycle?
20. Can you provide supporting data/justification or other information for your responses to these questions about threats?
21. Can you provide any additional information on the impact of fire on this species, particularly in relation to the 2006 and 2014 bushfires that occurred within the Grampians National Park

Management

22. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?
 23. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species?
 24. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?
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