Consultation on Species Listing Eligibility and Conservation Actions

*Lambertia fairallii* (Fairall’s honeysuckle)

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

1) the eligibility of *Lambertia fairallii* (Fairall’s honeysuckle) for inclusion on the EPBC Act threatened species list in the Critically Endangered category; and

2) the necessary conservation actions for the above species.

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform on conservation actions and further planning. As such, the below draft assessment should be considered to be tentative as it may change following responses to this consultation process.

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 by email to:
species.consultation@environment.gov.au

Please include species scientific name in Subject field.

or by mail to:

The Director
Terrestrial Threatened Species Section
Department of Climate Change, Energy, the Environment and Water
John Gorton Building, King Edward Terrace
GPO Box 858
Canberra ACT 2601

Responses are required to be submitted by 4 October 2022.

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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: https://www.dcceew.gov.au/environment/biodiversity/threatened.

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.dcceew.gov.au/system/files/pages/d72df1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2021.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: https://www.dcceew.gov.au/environment/biodiversity/threatened/nominations.

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: https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans.

Privacy notice

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department’s obligations under the Privacy Act 1988 (Cth) and the Department’s Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the ‘Common Assessment Method’ (CAM). As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.
The Department’s Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department’s Privacy Policy is available at: https://www.dcceew.gov.au/about/commitment/privacy.

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.
CONSULTATION QUESTIONS FOR *Lambertia fairallii* (Fairall’s honeysuckle)

SECTION A - GENERAL

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

2. Can you provide additional data or information relevant to this assessment?

3. Have you been involved in previous state, territory or national assessments of this species? If so, in what capacity?

PART 1 – INFORMATION TO ASSIST LISTING ASSESSMENT

SECTION B  DO YOU HAVE ADDITIONAL INFORMATION ON THE ECOLOGY OR BIOLOGY OF THE SPECIES? (If no, skip to section C)

Biological information

4. Can you provide any additional or alternative references, information or estimates on longevity, average life span and generation length?

5. Do you have any additional information on the ecology or biology of the species not in the current advice?

SECTION C  ARE YOU AWARE OF THE STATUS OF THE TOTAL NATIONAL POPULATION OF THE SPECIES? (If no, skip to section D)

Population size

6. Has the survey effort for this taxon been adequate to determine its national adult population size? If not, please provide justification for your response.

7. 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.
8. If not, can you provide a further estimate of the current population size of mature adults of the species (national extent)? Please provide supporting justification or other information.

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:
- □ <1000
- □ 1000–2000
- □ 2000–3000
- □ 3000–4000
- □ >4 000

Level of your confidence in this estimate:
- □ 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, information suggests this range
- □ 95–100% - high level of certainty, information indicates quantity within this range
- □ 99–100% - very high level of certainty, data are accurate within this range

SECTION D  ARE YOU AWARE OF TRENDS IN THE OVERALL POPULATION OF THE SPECIES? (If no, skip to section E)

9. Does the current and predicted rate of decline used in the assessment seem reasonable? Do you consider that the way this estimate has been derived is appropriate? If not, please provide justification of your response.

Evidence of total population size change

10. Are you able to provide an estimate of the total population size? 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:
11. Are you able to comment on the extent of decline in the species total population size over the last approximately 90 years (i.e. 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
12. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

**SECTION E** ARE YOU AWARE OF INFORMATION ON THE TOTAL RANGE OF THE SPECIES? (If no, skip to section F)

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

13. Does the assessment consider the entire geographic extent and national extent of the species? If not, please provide justification for your response.

14. Has the survey effort for this species been adequate to determine its national distribution? If not, please provide justification for your response.

15. Is the distribution described in the assessment accurate? If not, please provide justification for your response and provide alternate information.

16. Do you agree that the way the current extent of occurrence and/or area of occupancy have been estimated is appropriate? Please provide justification for your response.

17. 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.

   **Current 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.

**Current 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

**SECTION F** ARE YOU AWARE OF TRENDS IN THE TOTAL RANGE OF THE SPECIES? (If no, skip to section G)

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

18. Do you consider that the way the historic distribution has been estimated is appropriate? Please provide justification for your response.
19. Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the former 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:

- □ <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

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

SECTION G  DO YOU HAVE INFORMATION ON THREATS TO THE SURVIVAL OF THE SPECIES? (If no, skip to section H)

20. Do you consider that all major threats have been identified and described adequately?

21. To what degree are the identified threats likely to impact on the species in the future?

22. Are the threats impacting on different populations equally, or do the threats vary across different populations?

23. Can you provide additional or alternative information on past, current or potential threats that may adversely affect the species at any stage of its life cycle?

24. Can you provide supporting data/justification or other information for your responses to these questions about threats?

SECTION H  DO YOU HAVE INFORMATION ON CURRENT OR FUTURE MANAGEMENT FOR THE RECOVERY OF THE SPECIES? (If no, skip to section I)

25. What planning, management and recovery actions are currently in place supporting protection and recovery of the species? To what extent have they been effective?

26. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species?
27. Would you recommend translocation (outside of the species’ historic range) as a viable option as a conservation actions for this species?

SECTION I  DO YOU HAVE INFORMATION ON STAKEHOLDERS IN THE RECOVERY OF THE SPECIES?

28. Are you aware of other knowledge (e.g. traditional ecological knowledge) or individuals/groups with knowledge that may help better understand population trends/fluctuations, or critical areas of habitat?

29. Are you aware of any cultural or social importance or use that the species has?

30. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?

31. How aware of this species are land managers where the species is found?

32. What level of awareness is there with individuals or organisations around the issues affecting the species?
   a. Where there is awareness, what are these interests of these individuals/organisations?
   b. Are there populations or areas of habitat that are particularly important to the community?

PART 3 – ANY OTHER INFORMATION

33. Do you have comments on any other matters relevant to the assessment of this species?
Conservation Advice for
Lambertia fairallii (Fairall’s honeysuckle)

This draft document is being released for consultation on the species listing eligibility and conservation actions

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform conservation actions, further planning and a potential recovery plan. The draft assessment below should therefore be considered tentative at this stage, as it may change as a result of responses to this consultation process.

Note: Specific consultation questions relating to the below draft assessment and preliminary determination have been included in the consultation cover paper for your consideration.

This document combines the draft conservation advice and listing assessment for the species. It provides a foundation for conservation actions and further planning.

This document has drawn upon and built upon the current 2021 Conservation Advice for the species.

Lambertia fairallii © Copyright, S.D. Hopper & D. Coates (from Florabase).

Department of Climate Change, Energy, the Environment and Water
Conservation status

*Lambertia fairallii* (Fairall’s honeysuckle) is currently listed in the Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) effective from 16 July 2000. The species is eligible for listing because prior to the EPBC Act, it was listed as Endangered under the Endangered Species Protection Act 1992 (Cwth).

The Fairall’s honeysuckle was reassessed by the Threatened Species Scientific Committee to be eligible for listing as Critically Endangered under criterion 1 and 2. The Committee’s assessment is at Attachment A. The Committee’s assessment of the species’ eligibility against each of the listing criteria is:

- Criterion 1: A3ce: Critically Endangered
- Criterion 2: B1ab(i,ii,iii,iv,v): Critically Endangered
- Criterion 3: C1: Endangered

The main factors that make the species eligible for listing in the Critically Endangered category are its small geographic range, and past and future decline of adult subpopulations due to a combination of *Phytophthora cinnamomi* (a root-rotting oomycete pathogen), fire regimes that cause declines in biodiversity (with recurrent events happening before adequate seed set) and protracted drought.

In 2020, the Fairall’s Honeysuckle was assessed by Barrett et al (2020) and listed on the IUCN Red List of Threatened Species as Critically Endangered. The species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the Species Profile and Threats Database.

Species information

**Taxonomy**

Conventionally accepted as *Lambertia fairallii* G.J.Keighery (1983), Family: Proteaceae.

**Description**

Fairall’s honeysuckle is an erect, very dense compact shrub that grows up to 1.5 m high. Young branches and leaf bases are loosely covered with long white hairs. The rigid, almost stalkless leaves, crowded on short branchlets, are linear and up to 4 cm long, with an awn-like projection on the tip. Mature leaves are hairless above, with a network of veins on the upper surface, and covered with soft hairs underneath. The foliage of long plants is much less compact, and some leaves may have several lobes at the apex. The inflorescences, on the ends of the branchlets, may be solitary or clustered in groups of 2 or 3. Each inflorescence is composed of 5 to 7 tubular, golden-yellow flowers, enclosed in 17–27 dry brown bracts. The dark brown fruits are about 8 mm long and have 2 horns. (Hartley & Barrett 2008).

**Distribution**

Fairall’s honeysuckle is endemic to the Stirling Range National Park, which is located approximately 100 km north of Albany in Western Australia. The Stirling Range spans 62 km...
within the Park and is comprised of a series of isolated hills and peaks. Part of Fairall’s honeysuckle’s distribution is within the boundaries of the Eastern Stirling Range Montane Heath and Thicket ecological community at the Mount Success site (DAWE 2017). The Eastern Stirling Range Montane Heath and Thicket ecological community is listed as Endangered under the EPBC Act and will also benefit from any conservation actions put in place for Fairall’s honeysuckle.

The species’ distribution is currently separated into three subpopulations (Southwest of Mount Gog, Mount Success, and Yungemere), with the species historically found within an additional 2, subpopulations, Ellen Peak and Toolbrunup Peak, which are suspected to be extirpated (Table 1).

### Table 1 Subpopulations of Fairall’s honeysuckle

<table>
<thead>
<tr>
<th>Subpopulation</th>
<th>Metres above sea level</th>
<th>Fire years</th>
<th>Year</th>
<th>No. of sites</th>
<th>Subpopulation estimate</th>
<th>Reference</th>
</tr>
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<tr>
<td>Southwest of Mount Gog</td>
<td>634</td>
<td>1997</td>
<td>2005</td>
<td>1</td>
<td>3500+ mature 1000+ juvenile</td>
<td>Hartley &amp; Barrett 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2021</td>
<td>1</td>
<td>1600 mature 0 juvenile</td>
<td>DBCA (2022)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2020</td>
<td>2</td>
<td>0 mature 71 juveniles</td>
<td>DBCA (2022); S Barrett 2022b. pers comm 21 April</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2021</td>
<td>1</td>
<td>0 mature 1,000 juveniles</td>
<td>DBCA (2022)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2006</td>
<td>0</td>
<td>Extirpated</td>
<td>DBCA (2022)</td>
</tr>
<tr>
<td>Toolbrunup Peak</td>
<td>482.5</td>
<td>1996, 2019</td>
<td>2006</td>
<td>1</td>
<td>3 mature 0 juvenile</td>
<td>DBCA (2022)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2021</td>
<td>0</td>
<td>Extirpated</td>
<td>T Llorens 2022a. pers comm 1 April</td>
</tr>
</tbody>
</table>

**Note:** Mature plants are determined based on the production of reproductive structures.

The Ellen Peak subpopulation was comprised of 2 confirmed sites, on the south and south-east ridges. In 1991 the majority of the subpopulation was burnt in a fire, with poor post-fire rejuvenation. In 2000, the subpopulation was burnt by a second fire and no plants (adult or juvenile) have been detected at the site since. The sites were last monitored in 2006 and, after failing to detect any plants, the subpopulation was presumed to be extirpated (Hartley & Barrett 2008; DBCA 2022). Dieback due to *Phytophthora cinnamomi* and two fire events in short succession are suspected to be the cause of this decline (Hartley & Barrett 2008). The Toolbrunup Peak subpopulation was small, with less than 10 mature plants detected during monitoring events between 2006 and 2012. Fairall’s honeysuckle was not detected at the site during 2021 monitoring (T Llorens 2022a. pers comm 1 April), and the subpopulation is
suspected to either have had too small a seed bank to regenerate following the 2019/20 bushfires, or to have declined pre-fire due to *P. cinnamomi* (S Barrett 2022a. pers comm 12 April). It is unlikely that any rejuvenation will be detected at this site, and therefore the subpopulation is regarded as extirpated. In all subpopulations where the species is extant, ongoing declines in the number of mature plants has been recorded (DBCA 2022).

The species has a highly restricted geographic distribution, confined to individual peaks within the Stirling Range. Whilst the species is not currently classified as severely fragmented, there is some evidence of genetic divergence between subpopulations despite their close proximity (Obbens & Coates 1997). Therefore, current fragmentation due to little gene flow between subpopulations is possible, and is likely to be exacerbated by continued reductions in its distribution due to dieback caused by *P. cinnamomi*, drought and fire.

Seed collection efforts since the mid 1990’s has meant that seeds from all subpopulations, including the extirpated Ellen Peak and Toolbrunup Peak subpopulations, are preserved in a seed bank held at the Western Australian Threatened Flora Seed Centre, Kensington. Viability testing of seeds held in the collection have been performed through germination testing, with strong results (Obbens & Coates 1997; Hartley & Barrett 2008). As of April 2022, 10,653 Fairall’s honeysuckle seeds are held in the seedbank (A Crawford 2022. pers comm 6 April).

The seed bank has enabled Fairall’s honeysuckle to be propagated ex situ at the Botanic Gardens and Parks Authority (Kings Park), and then translocated into wild disease-free sites South of Stirling Range National Park. In 2007, 26 seedlings were translocated into site one (Benmore Tree Farm) (Cochrane et al. 2010). Two further supplementations of this site occurred in 2008 (27 seedlings) and 2009 (44 seedlings) (Cochrane et al. 2010). Although initial survivorship was high, with 76% of the translocated plants alive during monitoring in 2009 (Cochrane et al. 2010), and some seedlings produced, this site has not done well long term (S Barrett 2022a. pers comm 12 April). In 2011, 25 seedlings were translocated into a second site (Plantagenet) (Monks et al. 2019), however survivorship was poor, and further translocations into the site have not occurred (S Barrett 2022a. pers comm 12 April). These two translocations were experimental, and the sites have not been maintained.

In addition to Benmore Tree Farm and Plantagenet, 2 seed production areas were established for Fairall’s honeysuckle in 2021 at Porongorup National Park and Redmond (T Llorens 2022a. pers comm 1 April). The seed production areas have been established using seeds from several different subpopulations (T Llorens 2022b. pers comm 9 May). These areas specifically aim to grow Fairall’s honeysuckle to provide seeds for harvest, boosting the number of seeds available to store in seed banks and use for future translocations, without having to collect from the already depleted wild populations.
Map 1 Modelled distribution of Fairall’s honeysuckle

Source: Base map Geoscience Australia; species distribution data Species of National Environmental Significance database. Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the habitat or geographic feature that represents to recent observed locations of the species (known to occur) or habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Cultural and community significance

The genus *Lambertia* was named after Aylmer Bourke Lambert, a patron of botany in the 18th and 19th centuries (Cochrane 2013). Fairall’s honeysuckle was named after Arthur Fairall, the first superintendent of Kings Park and Botanic Gardens, Perth. He died while fighting a bushfire in the park. He was also responsible for introducing many native species into cultivation and was the first to record this species in 1968 (Wrigley & Fagg 1989).

The cultural, customary and spiritual significance of species and the ecological communities they form are diverse and varied for Indigenous Australians and their stewardship of Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, Indigenous Australians. Such knowledge may be held by Indigenous Australians who are the custodians of this knowledge and have the rights to decide how this knowledge is shared and used.
The Traditional Owners of the Stirling Range National Park are the Mineng and Koreng people of the Noongar Nation who are represented by the Wagyl Kaip Aboriginal Corporation. The Stirling Range National Park is important to Indigenous Australians with cultural sites at Kojaneerup and Moingup Springs in the vicinity of Fairall's honeysuckle (Hartley & Barrett 2008). There is no published ethnobotanical data relating directly to this species.

**Relevant biology and ecology**

**Habitat Ecology**
Fairall's honeysuckle occurs on montane ridgelines in dense heath at and above 350 m above sea level. It grows in shallow soils on metamorphosed sandstone and shale, mid-slope on exposed rocky south-facing ridges.

**Pollination Biology and Genetics**
Fairall's honeysuckle produces tubular golden-yellow flowers between May and September (Hartley & Barrett 2008). The species' pollination biology is unknown, however *Phylidonyris novaehollandiae* (New Holland honeyeaters) and *P. nigra* (white-cheeked honeyeaters) are pollen vectors for other *Lambertia* species (Hopper 1990; Pyke & Conner 1993) and therefore it is possible these birds also contribute to the pollination of Fairall's honeysuckle. Due to the unknowns regarding the pollination mechanisms of the species, the amount of natural gene flow between subpopulations is unclear, therefore making it difficult to determine how genetically distinct the subpopulations are. Initial genetic studies of the southwest of Mount Gog and Ellen Peak subpopulations, suggested that there was a greater level of genetic divergence between the 2 subpopulations, compared to 2 subspecies of *L. echinata* (Obbens & Coates 1997). In addition, using isozyme markers, it was determined that genetic diversity within the Ellen Peak subpopulation was low (Obbens & Coates 1997). These findings indicate that it may be appropriate to treat subpopulations located on different peaks as separate conservation units, however additional research should be conducted to confirm these findings (Obbens & Coates 1997).

**Fire Ecology**
Fairall’s honeysuckle is serotinous, storing seeds in its canopy. Fire is an important part of the life history of the species, resulting in complete death of adult plants and release of seeds into the soil, where they germinate and restore the population. Fairall’s honeysuckle seeds do not require special treatment to germinate, and studies have shown that collected seeds will germinate readily (mean germination rate of 93%) (Hartley & Barrett 2008). In trials with other *Lambertia* species, germination was also high, averaging 86%, however seedling mortality was also high unless specific pathogen, watering and shading treatments were met (Monks & Coates 2000).

Whilst fire is necessary for recruitment, population survival relies on the seeds germinating and reaching maturity prior to the next fire event (Obbens & Coates 1997). Fairall’s honeysuckle mature at approximately 7 years of age; however, reproductive output remains low for this species. Observations of plant growth and reproductive effort found that the average number of fruits will double from a single fruit per plant (at 7 years post-fire) to approximately 6 fruit per plant (at 12–13 years post-fire) (Hartley & Barrett 2008). Although inter-fire recruitment has been observed for this species (Hartley & Barrett 2008; Cochrane et al. 2010), it is insufficient to sustain subpopulations (S Barrett 2021. pers comm 3 May). An optimal fire interval is thought to be at least 14–17 years, which is double the juvenile period (Hartley & Barrett 2008), however...
the generation length of the species is estimated to be 30 years (Barrett et al. 2020) and therefore a burn frequency greater than 17 years is unlikely to negatively impact upon the species.

Non-sprouting shrubs are sensitive to decline and extinction from fire-driven mechanisms, such as death of standing plants and seeds, failure of seed release and/or germination, failure of seedling establishment, interruption of maturation or developmental growth and failure of seed production (Keith 1996). Spatial simulations of plant extinction have further shown that extinction probability increases for non-sprouting perennial shrubs, with increased frequency and scale of fire events (Bradstock et al. 1998). Given the low reproductive effort of Fairall’s honeysuckle, even 13 years post-fire (Hartley & Barrett 2008), appropriate intervals between fire events are likely to be essential in ensuring self-sustaining subpopulations of the already restricted species.

**Habitat critical to the survival**

Due to the species eligibility for listing (highly restricted range and decline in population size), all habitat is considered critical to the survival of the species. This includes currently occupied area and areas of similar habitat within the Stirling Range National Park, as well as the experimental translocated sites outside of the species’ natural range at Benmore Tree Farm, Plantagenet, Porongorup National Park and Redmond.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

**Important populations**

In this section, the word ‘population’ is used to refer to a subpopulation, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation.

Given there are only three populations of Fairall’s honeysuckle remaining (southwest of Mount Gog, Mount Success, and Yungemere), with a 2021 estimate of 1,600 mature plants, all populations are considered essential to the survival of the species. Since these populations are restricted to a narrow geographic distribution, and fire regimes that cause declines in biodiversity within the Stirling Range National Park have the potential to impact the whole of the species’ range, Fairall’s honeysuckle is considered to exist in one location.

**Threats**

Fairall’s honeysuckle is threatened by disease, fire regimes that cause declines in biodiversity, drought, climate change, disturbance, genetic impacts due to small population size, and seed predation by birds, small mammals and insects. The species is threatened by several fire related threats, including high frequency fire, fire-disease interactions, fire-drought interactions, and fire-granivore interactions. Although grazing by native and feral mammals has been recorded as a threat to other threatened species in the Stirling Range National Park (Cochrane et al. 2010; Rathbone & Barrett 2017), there are no published records of impacts to Fairall’s honeysuckle. Endemic subpopulations in the Stirling Range National Park are also at risk of pollinator disruption due to habitat fragmentation of the surrounding landscape (Obbens & Coates 1997; Coates et al. 2007), although no published records indicate how or whether these threats directly affect Fairall’s honeysuckle.
Threats in Table 2 are noted in approximate order of highest to lowest impact, based on available evidence.

<table>
<thead>
<tr>
<th>Threat</th>
<th>Status</th>
<th>Evidence</th>
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</thead>
<tbody>
<tr>
<td>Disease</td>
<td>![Image]</td>
<td>![Image]</td>
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</tbody>
</table>
| **Dieback caused by *Phytophthora cinnamomi*** | • Timing: current  
  • Confidence: observed  
  • Likelihood: almost certain  
  • Consequence: major  
  • Trend: unknown  
  • Extent: across the entire range | *Phytophthora cinnamomi* is an introduced soil-borne pathogenic oomycete, which results in plant death through the destruction of root systems and girdling of the stem at ground level. *Phytophthora cinnamomi* is listed as a Key Threatening Process under the EPBC Act (DAWE 2018). The Eastern Stirling Range Montane Heath and Thicket Community and many Stirling Range threatened species are significantly affected by *P. cinnamomi* dieback, which has been observed since the pathogen was found in the region in 1974 (Obbens & Coates 1997). Fairall’s honeysuckle is highly susceptible to the pathogen, and currently every subpopulation is infested with or threatened by it (Hartley & Barrett 2008). The pathogen has been spread to many of the peaks in the Stirling Range through the transport of contaminated soil. Infestations at higher altitudes have led to substantial downslope spread in broad fronts (Barrett 2005). The spread of the pathogen has ecological flow-on effects, such as increased fire fuel loads, decreased diversity and resulting loss of vertebrate pollinators, increased habitat loss and ground cover protection for small animal species (Hartley & Barrett 2008; DAWE 2018). *Phytophthora cinnamomi* can dispersed by root-to-root contact, in surface or sub-surface water flow and via mud vectored by vehicles, animals and walkers (Barrett 2005; DAWE 2018). Widespread seedling deaths have been recorded for Proteaceous species in the Stirling Range National Park due to *P. cinnamomi*. The under-developed root systems of obligate seeders may increase vulnerability to the disease. Post fire alterations in vegetative cover, soil chemistry, hydrology, increased surface run-off, and increased root tissue vulnerability may amplify the mortality from *P. cinnamomi* (Moore et al. 2014; Barrett 1996; Shearer et al. 2010).

Susceptibility studies have shown that Fairall’s honeysuckle experienced high mortality on exposure to the *P. cinnamomi* pathogen (Kmax 95%) and thus is exposed to a substantial risk of extinction in the wild (Barrett et al 2008; Shearer et al. 2010). Dieback may also interact with fire to increase the impact of the disease and accelerate collapse of obligate seeding plants as shown for the Stirling Range dryandra (Moore et al. 2014; Barrett & Yates 2015).

Although phosphite application is an effective mitigation strategy, with a significant reduction in colonisation by *P. cinnamomi* post application (Shearer & Crane 2012) there is no way of eliminating *P. cinnamomi* from the ecosystem (Barrett 2005), therefore the disease is an ongoing threat to Fairall’s honeysuckle. |
Fire regimes that cause declines in biodiversity

| Increase in fire frequency and severity | The life-history traits of the Fairall’s honeysuckle predispose it to high risk of population decline or extinction, resulting from short fire intervals, fire-disease interactions, and the cumulative exposure to these and other threatening processes (DAWE 2020b). A short-interval fire regime (<14 years) is likely to reduce the population size and vigour of the Fairall’s honeysuckle (Hardley & Barrett 2008). This species is obligate seeding and serotinous, in that adult plants die from fire, though fire releases the seeds to the soil (Obbens & Coates 1997). For this species to survive there needs to be suitable conditions for germination and recruitment, and then a fire free interval of preferably longer than 2 generation lengths (14-17 years) for adequate number of seeds to accumulate to ensure population persistence (Barrett 2005; Hartley & Barrett 2008). Each of the species’ 5 subpopulations have been burnt by at least one bushfire event since 1991, with fire return time of between 9 and 19 years. When a subpopulation has been burnt by more than one fire event, and the interval between these fires has been less than 14 years, it has resulted in substantial declines in the number of plants in the subpopulation. For example, at a site within the Ellen Peak subpopulation, 40 plants (80% of the subpopulation) were burnt in 1991 and only 10 seedlings appeared following the fire. Nine years later in 2000, 100% of the plants were burnt and no further seedlings appeared. The Ellen Peak subpopulation is now considered to be extirpated (Hartley & Barrett 2008). Similarly, the Mount Success subpopulation was burn by bushfires in 1991 and 2000. After a 9-year fire interval, species regeneration on Mt Success was extremely poor and densities of Fairall’s honeysuckle fell dramatically (Hartley & Barrett 2008). In 2019-20, following years of drought, catastrophic bushfire conditions resulted in extensive bushfires across southern Australia (DAWE 2020a; Gallagher 2020). The Mount Success and Yungemere subpopulations were completely burnt in 2019, and fire intensity was determined to be high in both subpopulations (DBCA 2022). In 2020-21 post-fire assessments of germination, the Yungemere subpopulation appears to be regenerating well, however substantially smaller numbers of juvenile plants compared to the number of individuals present pre-fire have been recorded at the Mt Success sites (DBCA 2022).

This type of event is increasingly likely to reoccur as a result of climate change (CSIRO & BOM 2015). Fire regimes that cause declines in biodiversity present a major threat of extinction for the Fairall’s honeysuckle. |
<table>
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<tbody>
<tr>
<td>• Timing: current</td>
<td>• Timing: current</td>
</tr>
<tr>
<td>• Confidence: observed</td>
<td>• Confidence: observed</td>
</tr>
<tr>
<td>• Likelihood: likely</td>
<td>• Likelihood: likely</td>
</tr>
<tr>
<td>• Consequence: major</td>
<td>• Consequence: major</td>
</tr>
<tr>
<td>• Trend: increasing</td>
<td>• Trend: increasing</td>
</tr>
<tr>
<td>• Extent: across part of its range</td>
<td>• Extent: across part of its range</td>
</tr>
</tbody>
</table>

Climate Change
### Increased frequency and intensity of drought and change to precipitation patterns
- **Timing:** current
- **Confidence:** inferred
- **Likelihood:** likely
- **Consequence:** major
- **Trend:** increasing
- **Extent:** across the entire range

Climate predictions model an increased frequency of extreme rainfall events for south-west Western Australia (CSIRO & BOM 2015), which may increase the spread of *P. cinnamomi*, although this effect may be tempered by the overall reduction in mean rainfall for the region. An increased frequency of drought is predicted along with overall increased mean temperatures (CSIRO & BOM 2015). Such changes in climate may cause widespread plant mortality in plant ecosystems, as many plants are vulnerable to drought stress and hydraulic failure, particularly if fire has preceded drought (Burgman & Lamont 1992, Allen et al. 2010; Choat et al. 2012).

The drier conditions amplified by climate change are predicted to cause further population contractions for Fairall’s honeysuckle and many other Stirling Range flora and fauna (Hartley & Barrett 2008).

Drought reduces the resilience of this species to other environmental threats. Seedling death was observed during the extended drought conditions of 2002 (Hartley & Barrett 2008). Ongoing decline of the southwest of Mount Gog subpopulation has been observed since 2005 with widespread limb and whole plant death. This appears to be primarily due to drought although other fungal pathogens may be implicated. Recent surveys in 2021 show a large decline in population size (DBCA 2022).

### Fragmentation

#### Loss of genetic diversity
- **Timing:** current
- **Confidence:** suspected
- **Likelihood:** possible
- **Consequence:** moderate
- **Trend:** unknown
- **Extent:** across part of its range

Fragmentation and reduced population size can lead to a loss of genetic variation and increased genetic divergence among subpopulations. Decreased genetic diversity and small subpopulation sizes increase the risk of extinction by loss of fitness and a reduction in the species ability to adapt to short term environmental changes (Hobbs & Yates 2003). The historical loss of connectivity and evidence of reduced diversity in the Ellen Peak subpopulation of Fairall’s honeysuckle indicates subpopulations may be fragmented and genetically isolated from each other (Obbens & Coates 1997; Hartley & Barrett 2008).

Small, isolated subpopulations are subject to the accumulation of deleterious genes due to genetic drift and lack of allele exchange, reducing the overall fitness of the population. There is no evidence that this is occurring in Fairall’s honeysuckle; however, future research should show if any subpopulations are at a higher risk of becoming unviable (Hartley & Barrett 2008).

### Grazing

#### Seed predation
- **Timing:** current
- **Confidence:** observed
- **Likelihood:** unknown
- **Consequence:** moderate
- **Trend:** static
- **Extent:** across the entire range

Seed predation is a natural occurrence but can be detrimental to plant survival for species with low seed production, or post fire when seeds are vital for repopulation. Seed predation was observed on 57% of tagged Fairall’s honeysuckle at Mount Success, and similarly heavy predation occurred at Yungemere in 2004 (Hartley & Barrett 2008). This predation was likely the results of birds, small mammals or insects as observed in other post-fire habitats (Tasker et al. 2011). Seed predation is likely to reduce the reproductive potential for the Fairall’s honeysuckle; however research is needed to determine the trends, frequency and consequence of seed predation levels.
Timing—identify the temporal nature of the threat;  
Confidence—identify the extent to which we have confidence about the impact of the threat on the species;  
Consequence—identify the severity of the threat;  
Trend—identify the extent to which it will continue to operate on the species;  
Extent—identify its spatial content in terms of the range of the species.

**Categories for likelihood are defined as follows:**
Almost certain – expected to occur every year  
Likely – expected to occur at least once every five years  
Possible – might occur at some time  
Unlikely – known to have occurred only a few times  
Unknown – currently unknown how often the threat will occur

**Categories for consequences are defined as follows:**
Not significant – no long-term effect on individuals or populations  
Minor – individuals are adversely affected but no effect at population level  
Moderate – population recovery stable or declining  
Major – population decline is ongoing  
Catastrophic – population trajectory close to extinction

Fire regimes that cause declines in biodiversity include the full range of fire-related ecological processes that directly or indirectly cause persistent declines in the distribution, abundance, genetic diversity or function of a species or ecological community. 'Fire regime' refers to the frequency, intensity or severity, season, and types (aerial/subterranean) of successive fire events at a point in the landscape.

Each threat has been described in Table 2 in terms of the extent that it is operating on the species. The risk matrix (Table 3) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; the spatial extent, and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts and using available literature.
Table 3 Risk Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not significant</td>
</tr>
<tr>
<td>Almost certain</td>
<td></td>
</tr>
<tr>
<td>Likely</td>
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<tr>
<td>Possible</td>
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<tr>
<td>Unlikely</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

Risk Matrix legend/Risk rating:
- Low Risk
- Moderate Risk
- High Risk
- Very High Risk

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be ‘very high’ or ‘high’. For genetic based threats it may be more appropriate to identify further research to determine the likelihood of this leading to recruitment failure in some subpopulations.

Conservation and recovery actions

Primary conservation objective

By 2030, the abundance and distribution (AOO) of Fairall’s honeysuckle has increased and viable populations are sustained in disease-free habitats.

Conservation and management priorities

Disease

- Implement a *P. cinnamomi* management plan to ensure that the pathogen is not spread further within the subpopulation southwest of Mount Gog and that the spread in areas outside of, but adjacent to the subpopulation is mitigated (DAWE 2018).

- Ensure that appropriate hygiene protocols are adhered to when entering or exiting the known location of the threatened species, such as those outlined in O’Gara et al. (2005) and the Arrive Clean, Leave Clean guidelines (DAWE 2015).

- Implement a hygiene management plan and risk assessment to protect known subpopulations from further outbreaks of *P. cinnamomi*. This may include but is not limited to:
  - Contaminated water is not used for firefighting purposes.
Contaminated soil is not introduced into the area as part of restoration, translocation, infrastructure development or revegetation activities.

Where appropriate, ensure that Fairall’s honeysuckle sites that are free of *P. cinnamomi* are sign posted and hygiene stations are implemented and maintained.

- Implement mitigation measures in areas that are known to be infested by *P. cinnamomi*, this may include but is not limited to the application of phosphite (H₃PO₃). The potential deleterious effects of phosphite as a fertiliser with prolonged usage should be noted and monitored for (Lambers et al. 2013), however should not overshadow the positive outcomes it has on species threatened by *P. cinnamomi* (Barrett & Rathbone 2018).

- Refer to the national Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*.

Fire

- Fires must be managed to ensure that: prevailing fire regimes do not disrupt the life cycle of this species and its surrounding ecological community; fires support rather than degrade the habitat necessary to the threatened species; fires do not promote invasion of exotic species; and fires do not increase impacts of *P. cinnamomi*.

- Where possible, ensure that intervals between fire is at least double the primary juvenile period for this species (no less than 14 to 17.5 years, preferably longer).

- Ensure fuel reduction and other planned fires outside this schedule are not implemented at Fairall’s honeysuckle sites and that any applied fire guarantees no subsequent wildfire impacts the populations within the critical juvenile period for the species.

Fragmentation – loss of genetic connectivity

- Prevent detrimental modification of currently occupied habitat and areas of suitable habitat within the Stirling Range National Park. Due to the highly restricted nature of the ecological community, avoiding impacts are the highest priority and most cost-effective conservation measure.

- Prevent impacts from any developments and activities, adjacent to or near subpopulations, that might result in further degradation, by planning for and appropriately mitigating off-site effects (for example, by avoiding disturbances to native vegetation and soil, applying recommended buffer zones around the subpopulations of Fairall’s honeysuckle and the ecological community, controlling run-off and avoiding significant hydrological changes and eutrophication).

Seed collection, propagation and other ex situ recovery action

- To manage the risk of losing genetic diversity, maintain appropriate seed collection and storage in long-term collections.

- To ensure best practice is followed to maximise viability and germinability of seeds stored (refer to Martyn Yenson et al. 2021).

- To ensure adequate insurance against loss of the species, support further translocations to sites free of *P. cinnamomi*. 
• Monitor all translocated individuals to maturity, seed set and recruitment to ensure they are viable and are contributing to a reduction in the extinction risk for the species (refer to Commander et al 2018).

• Maintain current seed production areas at Porongorup National Park and Redmond and expand to further locations as necessary, ensuring that lineages from all subpopulations are represented.

Climate Change
• Using distribution modelling and climate change predictive future modelling, map existing habitat and identify new future habitat.

Stakeholder engagement/community engagement
• Maintain support for community recovery teams which participate in the conservation of Fairall’s honeysuckle.

• Work with Traditional Owners to divulge any Traditional Knowledge associated with the species ensuring the practices to record, store and share this knowledge are mutually supported.

• Engage and involve Traditional Owners in conservation actions, including the implementation of survey, monitoring and management actions relevant for culturally important sites.

Survey and monitoring priorities
• Support and enhance existing long-term monitoring of all extant subpopulations, including any new translocated subpopulations.

• Monitor *P. cinnamomi* presence and impact.

• Monitor any translocated subpopulations to determine if successful reproduction and recruitment is occurring.

• Maintain precise spatial fire history records to integrate with subpopulation monitoring and response of subpopulations to fire events.

Information and research priorities
• Review all previous monitoring and research data and collate in a report/publication to identify critical knowledge gaps and assist with future evidenced-based decision making and research.

• Investigate options for enhancing or establishing additional subpopulations.

• Determine the genetic divergence between subpopulations located on different peaks.

• Review data from in situ and ex situ recovery actions and develop best practice guidelines for future seed collection, germination, propagation and translocated juvenile and adult plant survival.

• Investigate the ecological requirements of Fairall’s honeysuckle that are relevant to persistence:
  – Critical habitat (mapped).
Reproductive biology and pollination.

Seed bank dynamics, germination and recruitment, including the role of various disturbances, in particular the interaction of fire and *P. cinnamomi*, competition and rainfall.

The phenology and seasonal growth of the species.

The population genetic structure, levels of genetic diversity and minimum viable population size.

Biotic interactions (such as competition, grazing, drought) and determine consequences for long term population survival.

**Recovery plan decision**

As an approved, updated, and detailed Conservation Advice for the species would provide sufficient direction to implement priority conservation actions, mitigate against key threats, enable recovery and provide foundation for further planning, a national Recovery Plan is not required at this time.

**Links to relevant implementation documents**

This Conservation Advice is developed to be able to subsequently inform other planning instruments such as a Bioregional Plan or a multi-entity Conservation Plan.

Approved conservation advice for Eastern Stirling Range Montane Heath and Thicket (2017)


**Conservation Advice and Listing Assessment references**


CSIRO & BOM (Bureau of Meteorology) (2015) Climate change in Australia information for Australia’s natural resource management regions: technical report. CSIRO and Bureau of Meteorology, Australia.


DAWE (Department of Agriculture Water and the Environment) (2020a) National Indicative Aggregated Fire Extent Datasets, Viewed: October 27, 2020, Available at:


DBCA (Department of Biodiversity, Conservation and Attractions) (2022) Threatened and Priority Flora Database Search for Lambertia Fairallii accessed on the 1 April 2022. Prepared by the Species and Communities program for the Department of Agriculture, Water and the Environment for Approved Conservation Advice.

DPAW (Department of Parks and Wildlife) (2016) *Stirling Range National Park*. Department of Parks and Wildlife (WA), Kensington, WA.


Hopper DS (1990) *Bird and Mammal Pollen Vectors in Banksia Communities at Cheyne Beach, Western Australia*. Australian Journal of Botany, 28, 1, 61-75.


Llorens T (2022a). Personal communication by email 1 April 2022, Senior Conservation Botanist, Department of Biodiversity, Conservation and Attractions.

Llorens T (2022b). Personal communication by email 9 May 2022, Senior Conservation Botanist, Department of Biodiversity, Conservation and Attractions.
Attachment A: Listing Assessment for *Lambertia fairallii*

**Reason for assessment**

The Fairall’s honeysuckle was listed as under the *Endangered Species Protection Act 1992* and transferred to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) when it commenced in July 2000.

This assessment follows evaluation by experts of the conservation status of the species following the 2019/20 bushfires.

**Assessment of eligibility for listing**

This assessment uses the criteria set out in the [EPBC Regulations](#). The thresholds used correspond with those in the [IUCN Red List criteria](#) except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

**Key assessment parameters**

Table 4 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria. The definition of each of the parameters follows the [Guidelines for Using the IUCN Red List Categories and Criteria](#).

**Table 4 Key assessment parameters**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate used in the assessment</th>
<th>Minimum plausible value</th>
<th>Maximum plausible value</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of mature individuals</td>
<td>1,600</td>
<td>0</td>
<td>2,581</td>
<td>The IUCN Red List Assessment of the species estimated there to be between 250 and 5,000 mature Fairall’s honeysuckle (Barrett et al 2020). For this assessment, the estimate has been updated based on 2021 monitoring data for the three known subpopulations (Table 1; DBCA 2022). Since Fairall’s honeysuckle is a serotinous species, the presence of mature or juvenile plants in a population is strongly linked to the occurrence of fire events. Two of the three sites where this species is currently known to occur (Mount Success and Yungemere), were burnt in 2019 by fires, resulting in complete loss of adult plants (DBCA 2022). Monitoring at these sites in 2021 has only detected juvenile plants. Monitoring of the third subpopulation in 2021 (southwest of Mount Gog), which has not been burnt since 1997, estimated the number of mature plants to be 1,600. This estimate was calculated using a transect based extrapolated count method with 21 5x5 m quadrants.</td>
</tr>
</tbody>
</table>
Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification
--- | --- | --- | --- | ---

For this assessment, the estimated number of mature individuals present within the population in 2021 has been used (1,600). However, given the life history of the species, we may expect to see variation between the maximum and minimum value depending on time since each subpopulation was affected by a fire event. A minimum of zero mature plants has been estimated according to the value that would be expected if all subpopulations were affected by recent fire. A maximum of 2,581 plants has been estimated according to the sum of the mature plants present at all subpopulations prior to recent fires events, which includes the Mt Gog population (not burnt) plus the most recent estimate of the total number of mature plants at Mt Success, Yungemere, and Toolbrunup Peak pre fire.

Trend | Declining | The species’ known range has been regularly monitored by DBCA. Through this monitoring, there is evidence of site-specific extirpations (DBCA 2022). Since 2000, Fairall’s honeysuckle subpopulations at Ellen Peak and Toolbrunup Peak appear to have both become locally extinct, and a site within the Yungemere subpopulation has become extirpated (Hartley & Barrett 2008; DBCA 2022; T Llorens 2022a. pers comm 1 April). An additional 2 sites within the Mount Success subpopulation are suspected to be extirpated, however monitoring has not been done to confirm this (S Barrett 2022b. pers comm 21 April).

In all subpopulations where the species is extant, ongoing declines in the number of mature plants have been recorded (DBCA 2022). It is expected that further declines and site extirpations will occur as threats to the species continue.

Generation time (years) | 30 | Generation length has been established for previous IUCN Red List Assessments (Barrett et al. 2020).

Extent of occurrence | 13km² | An EOO of 13km² is a convex polygon estimate which has been calculated using point data from monitoring records collected by DBCA in 2021. A value less than this is not expected given the distance between each of the subpopulations.

Trend | Contracting | Fairall’s honeysuckle’s 5 subpopulations are distributed on an

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<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate used in the assessment</th>
<th>Minimum plausible value</th>
<th>Maximum plausible value</th>
<th>Justification</th>
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<td>east to west axis along the length of the Stirling Range. The southwest of Mount Gog subpopulation is the western most subpopulation, and the Ellen Peak subpopulation is the eastern most subpopulation, with the Toolbrunup Peak, Yungemere and Mount Success subpopulations distributed within the 40 km that separate the 2 subpopulations (Hartley &amp; Barrett 2008). The Ellen Peak subpopulation is extirpated, and this is also expected to be the case for the Toolbrunup Peak subpopulation (DBCA 2022, T Llorens 2022a. pers comm 1 April). The extirpation of the Toolbrunup Peak subpopulation is unlikely to have a significant impact on the EOO of the species, as it is located in between 2 extant subpopulations. However, as an outlying subpopulation, the loss of the Ellen Peak subpopulation will have resulted in a decline in the EOO of the species. The Mount Success subpopulation is located closest to the Ellen Peak subpopulation. It was burnt in 2019, resulting in the complete loss of adult plants. Initial monitoring has detected some recruitment of seedlings (DBCA 2022); however it is unlikely the population will be restored to pre-fire levels. Given the species’ 7-year juvenile period (Hartley &amp; Barrett 2008), if this subpopulation is burnt by another fire event before mature plants are established, it is at risk of also becoming extirpated, further reducing the EOO of the species.</td>
</tr>
<tr>
<td><strong>Area of Occupancy</strong></td>
<td>12km²</td>
<td></td>
<td></td>
<td>An AOO of 12km² has been calculated using point data from monitoring records collected by DBCA in 2021. The Stirling Range is well surveyed, and therefore it is unlikely that the species exists outside of the 3 extant monitored subpopulations. As such, the AOO is not likely to be larger than the calculated value.</td>
</tr>
</tbody>
</table>

AOO is a standardised spatial measure of the risk of extinction, that represents the area of suitable habitat known, inferred or projected to be currently occupied by the taxon. It is estimated using a 2 x 2 km grid to enable comparison with the criteria thresholds. The resolution (grid size) that maximizes the correlation between AOO and extinction risk is determined more by the spatial scale of threats than by the spatial scale at which AOO is estimated or shape of the taxon’s distribution. It is not a fine-scale estimate of the actual area occupied. In some cases, AOO is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. breeding sites for migratory species). Due to the known and suspected extirpations of Fairall’s honeysuckle sites and subpopulations as outlined in the “Number of mature individuals”

<p>| Trend                  | Contracting                      |                         |                         |                                                                                                                                             |</p>
<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate used in the assessment</th>
<th>Minimum plausible value</th>
<th>Maximum plausible value</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of subpopulations</td>
<td>3</td>
<td></td>
<td></td>
<td>Monitoring of the Stirling Range has identified 3 subpopulations – Southwest Mt Gog, Yungemere, and Mount Success (Hartley &amp; Barrett 2008).</td>
</tr>
<tr>
<td>Trend</td>
<td>Declining</td>
<td></td>
<td></td>
<td>Extirpation of the Ellen Peak subpopulation and likely the Toolbrunup subpopulation (DBCA 2022, T Llorens 2022a. pers comm 1 April) has reduced the number of Fairall's honeysuckle subpopulations from 5 to 3 since 2000, with further declines expected if the threats to the species are not managed.</td>
</tr>
<tr>
<td>Basis of assessment of subpopulation number</td>
<td>Rather than being a continuous range, The Stirling Range is comprised of a series of individual peaks and mountains. Fairall's honeysuckle is distributed across separate peaks. The pollination mechanisms of the species are unknown (Hartley &amp; Barrett 2008), making it difficult to determine if there is gene dispersal between plants located on different peaks. Initial genetic studies found there was genetic divergence between the southwest of Mount Gog and Ellen Peak plants, suggesting that plants located on different peaks should be considered separate conservation units (Obbens &amp; Coates 1997). Therefore, for this assessment plants located on the same peak/mountainous area are considered one subpopulation, and plants located on different peaks/mountainous areas are considered separate subpopulations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. locations</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>The number of locations for the species has previously been estimated to be 3, correlating with the existing number of subpopulations (Barrett et al. 2020). However, given the broad-scale threat of fire regimes that cause biodiversity declines to the species and its small geographic range (EOO 13 km²), it is possible that a severe bushfire could impact upon all of the species’ range. In 2019-20 extensive bushfires across southern Australia (DAWE 2020a; Gallagher 2020), resulted in 3 of the species’ 4 extant populations being completely burnt. This type of event is increasingly likely to reoccur as a result of climate change (CSIRO &amp; BOM 2015), threatening the sustainability of all subpopulations. Therefore, an estimate of one location has been used in this assessment.</td>
</tr>
<tr>
<td>Trend</td>
<td>Declining</td>
<td></td>
<td></td>
<td>The vulnerability of the species to a single threatening event has increased as the number of subpopulations and the geographic distribution of the species has declined, reducing the number of locations the species is considered to occur within to 1.</td>
</tr>
<tr>
<td>Basis of assessment of location number</td>
<td>A location in this assessment is defined using the IUCN definition: ‘a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations’ (IUCN 2022).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The 2019/20 fire demonstrated the ability of a single bushfire season to burn multiple subpopulations. Given the changing climate, it is likely the frequency and severity of bushfires will increase in the future (CSIRO & BOM 2015). This, coupled with a continuing decline in the species’ extent of occurrence, indicates that there is a real possibility of all subpopulations being impacted by a single catastrophic bushfire event.

### Fragmentation

The distribution of Fairall’s honeysuckle is not severely fragmented (meaning 50% or more of the population is not located within small and isolated patches).

### Fluctuations

Fairall’s honeysuckle is not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals, meaning none of these parameters change by at least an order of magnitude.

### Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate used in the assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum plausible value</td>
<td>Maximum plausible value</td>
</tr>
<tr>
<td>The 2019/20 fire demonstrated the ability of a single bushfire season to burn multiple subpopulations. Given the changing climate, it is likely the frequency and severity of bushfires will increase in the future (CSIRO &amp; BOM 2015). This, coupled with a continuing decline in the species’ extent of occurrence, indicates that there is a real possibility of all subpopulations being impacted by a single catastrophic bushfire event.</td>
<td></td>
</tr>
</tbody>
</table>

### Criterion 1 evidence

Eligible under Criterion 1 A3ce for listing as Critically Endangered

The generation length of the species is 30 years (Barrett et al. 2020), so the relevant time period for Criterion 1 is 90 years.

Fairall’s honeysuckle was first discovered in 1968 (Obbens & Coates 1997), therefore the exact amount of population reduction over the past 3 generations cannot be determined through observational data alone. However, monitoring of the species since 1982 has detected an ongoing decline in the species, including a decline in its areas of occupancy (AOO), extent of occurrence (EOO) and quality of habitat (DBCA 2022). Here the occurrence and cause of recent

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declines are outlined, and these declines are used to infer possible future declines in the population.

Population decline

Fairall’s honeysuckle has been known to occur within 5 subpopulations – southwest of Mount Gog, Yungemere, Ellen Peak, Toolbrunup Peak and Mount Success (DBCA 2022). Since 2000, Fairall’s honeysuckle subpopulations at Ellen Peak and Toolbrunup Peak appear to have both become locally extinct (Hartley & Barrett 2008; T Llorens 2022a. pers comm 1 April), and a site within the Yungemere subpopulation has become extirpated (DBCA 2022). These extirpated subpopulations and site possessed a small number of mature plants pre-fire (less than 100), with no mature or juvenile plants detected at the sites during post-fire monitoring in 2006 for the Ellen Peak subpopulation and 2021 for Toolbrunup Peak subpopulation and the Yungemere site (DBCA 2022; T Llorens 2022a. pers comm 1 April). An additional 2 sites within the Mount Success subpopulation are suspected to be extirpated, however monitoring has not been performed to confirm this (S Barrett 2022b. pers comm 21 April). These declines have caused a contraction of the species’ EOO and AOO (now 13 km$^2$ and 12 km$^2$ respectively), and can be primarily attributed to the cumulative impacts of *P. cinnamomi*, and the exposure to fire regimes that cause declines in biodiversity (Barrett et al 2020; Hartley & Barrett 2008). In all subpopulations where the species is extant, ongoing declines in the number of mature plants has been recorded (DBCA 2022). For example, drought and *P. cinnamomi* has caused the subpopulation southwest of Mount Gog to decline from an estimated 10,000 mature plants in 2013 to 1600 during most recent monitoring in 2021 (DBCA 2022).

A population decline of 30 to 50% is suspected to have occurred for the species over the past three generations (Barrett et al 2020). There is no evidence to suggest that this decline has since slowed and, in fact, there is evidence to suggest that these threats will increase in severity. In addition, because extirpations since the mid 2000’s have occurred, the size of the population and the species’ AOO and EOO are highly restricted. Any further extirpations are likely to cause a substantial reduction in these parameters, considerably impacting the viability of the species in situ. Therefore, there is support for the second statement that as much as 80% or more of the remaining population may be lost within the next three generations (Barrett et al 2020).

Ongoing causes of population reduction

Increased fire intervals, drought and dieback from *P. cinnamomi* are all ongoing and potentially increasing threats that are acting on the Fairall’s honeysuckle population. Fairall’s honeysuckle is a serotinous and obligate seeding, and therefore its survival is dependent on juvenile plants reaching maturity within the interval between fire events, making it particularly vulnerable to increased frequency of fires (Obbens & Coates 1997; Barrett 2005; Hartley & Barrett 2008). Local extinction of the Ellen Peak subpopulation after its range was burnt by 2 bushfires within a 9-year period (Hartley & Barrett 2008) is a clear example of the species’ vulnerability to fire regimes that cause declines in biodiversity. Continuing decline of subpopulations outside of bushfire events is also occurring. Widespread limb and whole plant death primarily due to drought has been recorded in the southwest of Mount Gog subpopulation since 2005, with surveys in 2021 depicting a dramatic decline in population size (DBCA 2022). In addition, the species is subject to dieback and plant death caused by *P. cinnamomi*, an introduced pathogen which destroys root systems (DAWE 2018). Fairall’s honeysuckle is highly susceptible to the
pathogen, and currently every subpopulation is infested with or threatened by it (Hartley & Barrett 2008). Susceptibility studies have shown that Fairall’s honeysuckle experienced high mortality on exposure to the *P. cinnamomi* pathogen and thus is exposed to a substantial risk of extinction in the wild (Barrett et al. 2008; Shearer et al. 2010).

Climate change is predicted to reduce winter rainfall within south-west Australia by as much as 50% by 2090 (CSIRO & BOM 2015). If this occurs, it will likely result in increased drought pressures within the Stirling Range, increasing the occurrence of limb and whole plant deaths of Fairall’s honeysuckle as seen in the southwest of Mount Gog subpopulation (DBCA 2022). An altered climate is also predicted to result in an increase in the severity and occurrence of bushfires (CSIRO & BOM 2015). Bushfires in 2019-20 burnt 3 out of 4 of the Fairall’s honeysuckle subpopulations that were extant at the time. Given the small geographic range of the species, harsher fire weather climates could see the whole of the species’ range impacted during a single catastrophic bushfire event and increase the likelihood of the area being re-burnt before an appropriate fire interval is met. Although the predicted decrease in run-off due to reduced rainfall (CSIRO & BOM 2015) may lessen the spread of *P. cinnamomi*, its impact upon Fairall’s honeysuckle maybe more severe. It is possible that dieback interacts with fire to increase the impact of the disease and accelerate collapse of obligate seeding plants as shown for the Stirling Range Dryandra (Moore et al. 2014; Barrett & Yates 2015). Observations have also shown that the impact of dieback may be worsened post-fire, due to altered hydrology and increased surface run-off (Barrett 1996), as well as increased root tissue vulnerability (Shearer et al. 2010). Therefore, with fire predicted to become more common (CSIRO & BOM 2015), the negative impacts of *P. cinnamomi* may also increase.

The Committee considers that the Fairall’s honeysuckle is expected to experience a population reduction of as much as 80% or more over the next 3 generations (Barrett et al. 2020), based on evidence of past declines and ongoing, and likely increasing threats. Therefore, the species has met the relevant elements of Criterion 1, including Criteria A3, with an observed decline of AOO, EOO and quality of habitat (c) as well as observed effects of *Phytophthora cinnamomi* (e), to make it eligible for listing as Critically Endangered.
Criterion 2 evidence

Eligible under Criterion 2 B1ab(i,ii,iii,iv,v) for listing as Critically Endangered

The extent of occurrence is estimated at 13 km², and the area of occupancy is estimated at 12 km², meeting the threshold of Critically Endangered under B1 and Endangered under B2. These figures are based on the mapping of point records, obtained from state governments, museums and the 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 (IUCN 2022).

In 2019-20 extensive bushfires across southern Australia (DAWE 2020a; Gallagher 2020), resulted in 3 of the species’ 4 extant subpopulations being burnt. Fire severity and occurrence is predicted to increase as a result of climate change (CSIRO & BOM 2015). Given the broad-scale threat of fire regimes that cause declines in biodiversity to the species, it is possible that a severe bushfire could impact the whole of the species’ range, therefore the species is regarded as occurring in one location. Therefore, the species meets the threshold of Critically Endangered under (a). The distribution of Fairall’s honeysuckle is not severely fragmented (meaning 50% or more of the population is not located within small and isolated patches).

A decline in the number of mature individuals has been observed in all subpopulations due to current and ongoing threats (see Criterion 1 for details). These declines have resulted in extirpation of the Ellen Peak and likely the Toolbrunup Peak subpopulations as well as sites within the Yungemere and likely the Mount Success subpopulations (DBCA 2022; S Barrett 2022b. pers comm 21 April; T Llorens 2022a. pers comm 1 April), reducing the number of subpopulations from 5 to 3, as well as the EOO and AOO of the species. In addition, as each subpopulation is infested with *P. cinnamomi* which continues to spread (Hartley & Barrett 2008), deteriorating the quality of the species’ habitat, elevating the species’ risk of extinction.
(Barrett et al 2008; Shearer et al. 2010). Therefore, the species has met the requirements of condition (b).

The Committee considers that the species’ geographic distribution (Extent of Occurrence (EOO) and Area of Occupancy (AOO)) is very restricted (B1), the number of locations is very restricted (a), and continuing decline is observed in EOO (i), AOO (ii), quality of habitat (iii), number of subpopulations (iv), and number of mature individuals (v). Therefore, the species has met the relevant elements of Criterion 2 to make it eligible for listing as Critically Endangered.

**Criterion 3 Population size and decline**

<table>
<thead>
<tr>
<th>Estimated number of mature individuals</th>
<th>Critically Endangered (Very low)</th>
<th>Endangered (Low)</th>
<th>Vulnerable (Limited)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 250</td>
<td>&lt; 2,500</td>
<td>&lt; 10,000</td>
</tr>
</tbody>
</table>

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:

- \( \text{(i) Number of mature individuals in each subpopulation} \leq 50 \leq 250 \leq 1,000 \)
- \( \text{(ii) } \% \text{ of mature individuals in one subpopulation} = 90 - 100\% 95 - 100\% 100\% \)
- \( \text{(b) Extreme fluctuations in the number of mature individuals} \)

**Criterion 3 evidence**

**Eligible under Criterion 3 C1 for listing as Endangered**

The estimated number of mature individuals in the population is between 0 and 2,581, with the current estimate of 1,600 used for this assessment. This estimate is greater than 250 mature individuals, but less than 2,500 mature individuals, placing the species within the Endangered column for criteria 3. An ongoing decline of as much as 80% of the remaining population could occur within the next 3 generations (Barrett et al. 2020). Assuming this decline is linear, the species would safely qualify for the Critically Endangered category under C1, however due to the number of mature individuals, the species can only qualify for Endangered under Criteria 3 C1.
The number of mature individuals in the subpopulation south-west of Mount Gog is greater than 1,000, therefore the species does not meet the criteria of C2a(i). Currently, all the mature individuals are located within this single subpopulation, indicating the species may qualify for Endangered under C2a(ii). However, given the rejuvenation currently occurring in the Yungemere and Mount Success subpopulations, the species may not qualify for this sub criteria in the near future, and therefore it is not considered as doing so for this assessment. The species is not subject to extreme fluctuations in the number of mature individuals, and therefore does not qualify for criterion C2b.

The Committee considers that the estimated total number of mature individuals of this species is low. There is a projected continuing decline at a very high rate. Therefore, the species has met the relevant elements of Criterion 3 to make it eligible for listing as Endangered.

**Criterion 4 Number of mature individuals**

<table>
<thead>
<tr>
<th></th>
<th>Critically Endangered</th>
<th>Endangered</th>
<th>Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D. Number of mature individuals</strong></td>
<td>&lt; 50</td>
<td>&lt; 250</td>
<td>&lt; 1,000</td>
</tr>
<tr>
<td><strong>D2.</strong> Only applies to the Vulnerable category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time</td>
<td></td>
<td></td>
<td>D2. Typically: area of occupancy &lt; 20 km² or number of locations ≤ 5</td>
</tr>
</tbody>
</table>

The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the common assessment method.

**Criterion 4 evidence**

**Not eligible**

The total number of mature individuals is 1,600 (DBCA 2022) which is not considered low. Given the number of locations for the species is one, the species qualifies for the Vulnerable category under D2, however EPBC Regulations do not currently allow a species is be listed in a threatened category based on Criterion D2 only. Therefore, the species has not met this required element of this criterion.
## Criterion 5 Quantitative analysis

<table>
<thead>
<tr>
<th>Critically Endangered Immediate future</th>
<th>Endangered Near future</th>
<th>Vulnerable Medium-term future</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicating the probability of extinction in the wild to be:</strong></td>
<td>≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)</td>
<td>≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)</td>
</tr>
</tbody>
</table>

## Criterion 5 evidence

### Insufficient data to determine eligibility

Population viability analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

### Adequacy of survey

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.

### Public consultation

Notice of the proposed amendment and a consultation document is made available for public comment for a minimum of 30 business days. Any comments received relevant to the survival of the species/subspecies are considered by the Committee as part of the assessment process.

### Listing and Recovery Plan Recommendations

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.