



Consultation on Species Listing Eligibility and Conservation Actions

Styphelia psiloclada

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

- 1) the eligibility of *Styphelia psiloclada* for inclusion on the EPBC Act threatened species; 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@awe.gov.au

Please include species scientific name in Subject field.

or by mail to:

The Director
Bushfire Affected Species Assessments Section
Department of Agriculture, Water and the Environment
John Gorton Building, King Edward Terrace
GPO Box 858
Canberra ACT 2601

Responses are required to be submitted by 29 July 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.awe.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: <https://www.awe.gov.au/sites/default/files/env/pages/d72dfd1a-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.awe.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.awe.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.awe.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 *Styphelia psiloclada*

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 an 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:

- 1–50 51–250 251–1000 >1000 >10 000

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 in the past? 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:

1–50 51–250 251–1000 >1000 >10 000

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

11. Are you able to comment on the extent of decline in the species' total population size in the past? 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:

<10 km² <100 km² 100 – 5 000 km² 5 001 – 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 – 99 km² 100 – 500 km² 501 – 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:

<10 km² <100 km² 100 – 5 000 km² 5 001 – 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 – 99 km² 100 – 500 km² 501 – 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 *Styphelia psiloclada*

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 eligibility of the species for listing and inform conservation actions, further planning and the potential need for a 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.

The survey effort is not considered adequate and there is insufficient scientific evidence to support the assessment.



Photos of *Styphelia psiloclada*. Left to right - © Copyright, Jackie Miles (2011), © Copyright, John Blay (2022)

Conservation status

Styphelia psiloclada is not listed as a threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act).

Styphelia psiloclada was assessed by the Threatened Species Scientific Committee to not be eligible for listing under the EPBC Act. The Committee's assessment is at Attachment A. The Committee assessment of the species' eligibility against each of the listing criteria is:

- Criterion 1: Insufficient data
- Criterion 2: Insufficient data
- Criterion 3: Insufficient data
- Criterion 4: Insufficient data
- Criterion 5: Insufficient data

The main factors that make the species ineligible for listing are a lack of survey data on population size and trends, and a lack of information about the key threats to the species. However, the lack of available information does not indicate that the species is unthreatened. The species may become eligible for listing when further information on population size and threats becomes available. As such, field surveys are considered a high priority in order to establish the species' conservation status.

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 *Styphelia psiloclada* J.M.Powell (1992), Family: Ericaceae. There is no common name in regular use.

Styphelia psiloclada had previously been included in *Styphelia triflora* (pink five corners) or *Styphelia viridis* (green five corners), since some of its leaf and floral characters are similar to one or other of these taxa, or intermediate between them. However, *S. psiloclada* differs from pink five corners in leaf shape (being more like green five corners), and in having shorter petioles and sepals (Powell et al. 1992).

Description

Styphelia psiloclada is an erect to spreading shrub which grows 60–150 cm high. The bark is pale brown, rough and corky towards the base. The leaves are oblong and sometimes broad-ovate to elliptic, approximately 8–17 mm long and 4–8 mm wide. The tubular flowers are light pink to dark crimson-pink and lighter inside. They are usually single but sometimes found in groups of twos or threes (Powell et al. 1992; Wood 2021).

Distribution

Styphelia psiloclada is known from three areas in south east New South Wales (NSW): Morton National Park (NP) in the Northern Budawang Range, Wadbilliga NP and South East Forest NP (Map 2). The majority of information for this species was sourced from the Atlas of Living Australia (ALA), which contained 19 occurrence records from 1985–2014 (after duplicates and records with low spatial quality removed). The majority of records were collected in the 1980s and 1990s (ALA 2022).

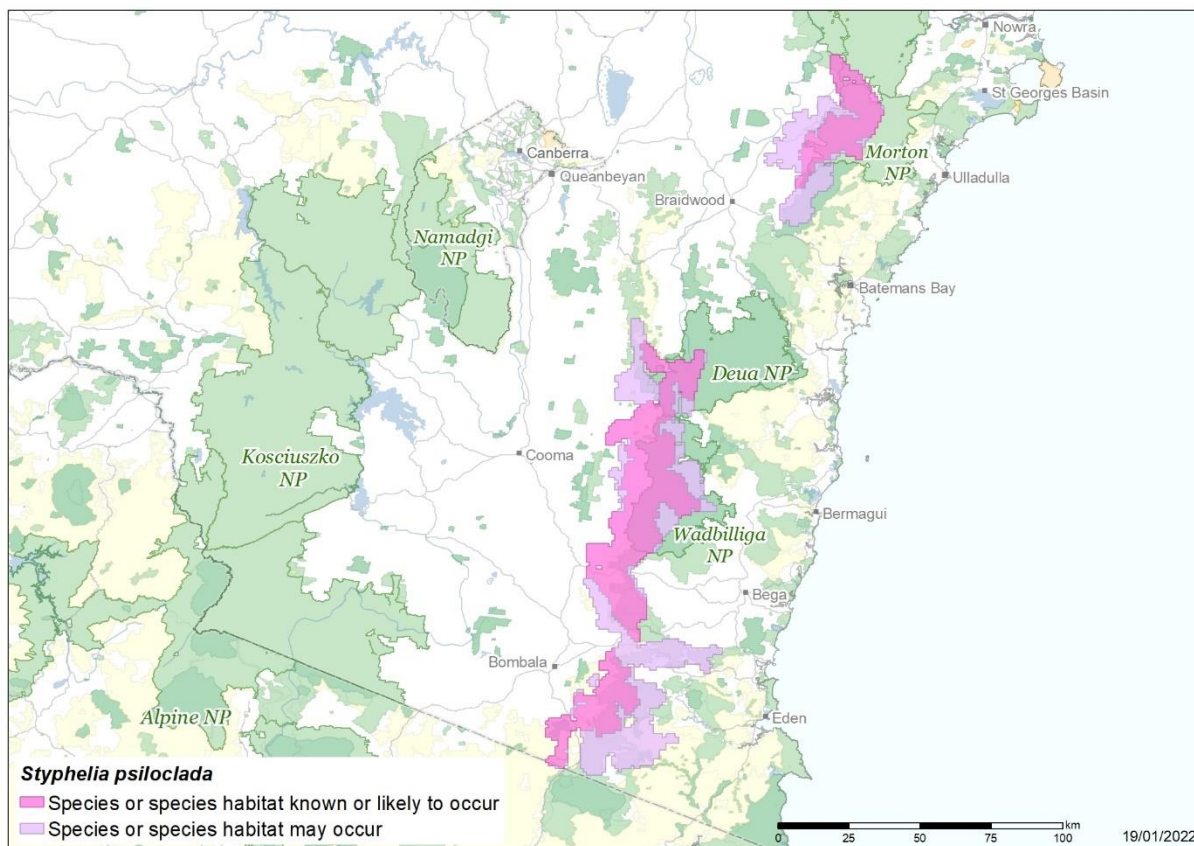
The species appears to occur in three distinct subpopulations (Table 1), one in Morton NP, another over 100 km southwest in Wadbilliga NP and the third in South East Forest NP approximately 50 km further south (ALA 2022). The total population size and distribution of the species is unknown as targeted surveys have not been undertaken. Some records describe the species as ‘uncommon’ and ‘occasional’ (ALA 2022). Several records are located adjacent to fire trails and walking tracks. All records occur on protected tenure in National Parks, apart from one occurrence of the species on private property near Nerriga, east of Morton NP (D. Albrecht 2022 pers. comm.). However, no specimens have been lodged for this locality.

Table 1 Distribution of *Styphelia psiloclada*, including subpopulation size and fire history

| Locality (ALA 2022) | Subpopulation size | Fire history (DPE 2022)* |
|----------------------|--------------------|---|
| Morton NP | Unknown | Bushfire – 2019-20 Prescribed burns have also occurred in the area |
| Wadbilliga NP | Unknown | Bushfire – 2003-04, 2019-20 Prescribed burns have also occurred in the area |
| South East Forest NP | Unknown | Bushfire – 1952-52, 1981-82, 2010-11, 2019-20, Prescribed burns have also occurred in the area |

* The fire extent for each bushfire overlaps with the species’ known distribution, however, the whole subpopulation is unlikely to have been burnt during each fire event.

Map 2 Modelled distribution of *Styphelia psiloclada*



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 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.

Styphelia psiloclada is found across land belonging to multiple Traditional Owner cultural and dialect groups including the Yuin and Bidwell people (AIATSIS 1996). There is little published information on how Yuin or Bidwell people related to Country in this region and what that may mean for the cultural significance of *S. psiloclada*.

Various species in the genus *Styphelia* were once a common local native bush tucker for Indigenous Australians along the east coast of Australia (Manson & Whiteside 2001). For example, the fruit of the related pink five corners and green five corners were used both as a medicine and food source. From August to November, the fruit was traditionally collected and eaten raw. The green unripe fruit was also eaten to relieve digestive problems. Flowers were eaten and nectar was also extracted (Manson & Whiteside 2001). The plant's annual life cycle was also used as an indicator for other forms of hunting and gathering. For example, *Pogona barbata* (eastern bearded dragon) was attracted to *Styphelia* species at flowering time to catch insects. This provided Indigenous Australians with a convenient way of catching the eastern bearded dragon which was also a popular food source (Manson & Whiteside 2001).

Further consultation with the Traditional Owners of these lands will benefit the conservation of the species by providing awareness of Traditional Knowledge and management practices on Country.

Relevant biology and ecology

Habitat

Styphelia psiloclada grows in open forests and heathland on rocky ridges, steep slopes and broad gullies with well to poorly drained skeletal sandy soils or sandy loams over granite or other igneous rocks. The species is commonly found at 900–1300 m above sea level (ASL), however in Morton NP the species was recorded at 700 m ASL (Powell et al. 1992; ALA 2022).

Associated species include *Eucalyptus fastigata* (brown barrel), *E. radiata* (narrow-leaved peppermint), *E. fraxinoides* (white mountain ash), *E. pauciflora* (snow gum), *E. kybeanensis* (Kybean mallee ash) and *Allocasuarina nana* (dwarf she-oak) (Powell et al. 1992; ALA 2022).

Reproductive ecology

The reproductive ecology of *S. psiloclada* is not well understood. The species flowers from January to March (Powell et al. 1992). The primary juvenile period (time from germination to produce seeds) of the species is unknown. However, other Ericaceae such as *Leucopogon* have primary juvenile periods of 3–11 years (Ooi 2019). Therefore, it is likely that the primary juvenile period for *S. psiloclada* is within this range.

The longevity of adult plants is unknown. However, other members of the genus can be used to infer this parameter. For example, the related pink five corners and green five corners are both thought to have a lifespan of up to 50 years (Falster et al. 2021). This is consistent with the observation that a record of *S. psiloclada* from 1998 had not been burnt since 1957 and thus had persisted for at least 40 years in the absence of fire (ALA 2022). Therefore, it is plausible to consider the species' lifespan may be 40 years or longer.

The pollinators of *S. psiloclada* are unknown, however based on the red, tubular flowers it is likely to be bird pollinated, as is common in other Ericaceae (Keighery 1996; Johnson 2013). Moths and butterflies are pollinators of some *Styphelia* species (Keighery 1996) and European honeybee (*Apis mellifera*) have found to pollinate some New Caledonian *Styphelia* (Kato & Kawakita 2004).

The species' germination requirements are unknown but may be similar to other Ericaceae where fire is required to break seed dormancy in many species (Gilmour et al. 2000). It's possible the species displays delayed seed germination following fire, as has been observed in other Ericaceae species (Keith 2002; Ooi 2010). However, seed germination requirements in the Ericaceae can be complex and are poorly understood. For example, the woody-fruited species *S. tenuiflora* (common pin-heath) from Western Australia exhibited physiological dormancy for up to two months post-release from the fruit (either buried or in litter) but by 24 month these seeds were no longer viable (Norman & Koch 2008). Further studies are required into the seed biology and dormancy mechanisms for *S. psiloclada*.

Fire ecology

The species is thought to be an obligate seeder (Falster et al. 2021; Gallagher 2022). However, on-ground observations are required to confirm this. The fire response of species in the *Styphelia* genus are variable; some species are obligate seeders, some are resprouters and some are facultative seeders (exhibit both responses) (Falster et al. 2021).

Styphelia psiloclada may be negatively impacted by high frequency fires where they are severe enough to kill adult plants and occur at timescales short enough to kill regenerating seedlings before they are reproductively mature and able to replenish the soil seed bank or develop sufficient woody tissue to withstand further fires (Keith 1996). Typically, the fire-free interval required by many woody species is approximately 15 years (Keith 1996). This is particularly true for narrow range endemics, which may lose all standing individuals in a single fire event (Auld 1996). Some species, for example shrubs and trees in low productivity environments, may require longer fire-free periods (Gosper et al. 2013).

It is unclear if the species is capable of recruiting in the absence of fire, although some other south east Australian Ericaceae species produce a small percentage of seed lacking physiological dormancy mechanisms, which could allow occasional recruitment in the absence of fire (Keith 1997).

Habitat critical to the survival

Styphelia psiloclada grows in open forests and heathland on rocky ridges, steep slopes and broad gullies with well to poorly drained skeletal sandy soils or sandy loams over granite or other igneous rocks. The species is commonly found at 900–1300 m ASL, however in Morton NP the species was recorded at 700 m ASL (Powell et al. 1992; ALA 2022).

The habitat critical to the survival of *S. psiloclada* includes the area of occupancy of known populations; areas of similar habitat adjoining known populations (as described under habitat above), which provide potential habitat for natural range extension and allow pollinators or biota essential to the survival of the species to move between populations; and areas identified as suitable for translocations.

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 subpopulation (as defined by IUCN 2001), in keeping with the terminology used in the EPBC Act and state/territory environmental legislation. An 'important population' is a population that is necessary for a species' long-term survival and recovery (DotE 2013).

Until sufficient data have been collected to demonstrate otherwise, all populations of *S. psiloclada* are important for the long-term recovery and survival of this species.

Threats

There is little available information on the threats to *S. psiloclada*. The species is likely to be threatened by fire regimes that cause declines in biodiversity and climate change (Table 2), while other potential threats to the species include recreational/management activities, dieback caused by *Phytophthora cinnamomi* and impacts from invasive species (Table 2).

Threats in Table 2 are noted in approximate order of highest to lowest impact, based on available evidence.

Table 2 Threats

| Threat | Status ^a | Evidence |
|---|--|---|
| Habitat loss, disturbance and modification impacts | | |
| Fire regimes that cause declines in biodiversity ^b | <ul style="list-style-type: none"> • Timing: current/future • Confidence: inferred • Likelihood: almost certain • Consequence: major • Trend: increasing • Extent: across the entire range | <p>'Fire regimes that cause declines in biodiversity' is listed as a key threatening process under the EPBC Act (DAWE 2022). The fire response of <i>S. psiloclada</i> is unknown and no post-fire surveys have been done in the species distribution. The species is thought to be an obligate seeder (Falster et al. 2021), a life-history that predisposes it to several fire-related threats (DAWE 2022). However, on-ground observations are required to confirm this (see 'Relevant biology and ecology' above).</p> <p><i>High frequency fire</i></p> <p><i>Styphelia psiloclada</i> is likely to be negatively impacted by high frequency fires where they are severe enough to kill adult plants and occur at short enough intervals to kill regenerating seedlings before they are able to replenish the soil seed bank (Keith 1996). The minimum recommended fire free interval for woody species such as <i>S. psiloclada</i> is approximately 15 years (Keith 1996).</p> <p><i>Low frequency fires</i></p> <p>Low frequency fires can pose a threat to species that have limited recruitment in the absence of fire. However, it is unknown whether <i>S. psiloclada</i> recruits in the absence of fire. The maximum tolerable fire-free interval for the species is unknown.</p> <p><i>Out-of-season fire</i></p> <p>Out-of-season fires (i.e. during cooler months) can lead to delayed and reduced levels of seedling emergence in species with physiologically dormant seeds (Ooi 2007).</p> <p><i>High severity fire</i></p> <p>High severity fire alone is unlikely to lead to population decline in <i>S. psiloclada</i>. High severity fire may lead to adult plant mortality and mortality of some seed in the soil seed bank close to the surface. However, only seeds near the surface (i.e., the top 3–5 cm) are exposed to extreme temperatures (Palmer et al. 2018; Tangney et al. 2020).</p> <p><i>Fire history</i></p> <p>In 2019-20, catastrophic bushfire conditions resulted in extensive bushfires across eastern Australia. Gallagher (2022) reports that 52% percent of the species modelled distribution was within the extent of these fires (and 86% of Australasian Virtual Herbarium (AVH) occurrences). No post-fire surveys have been conducted in the species distribution, so these figures are unable to be verified by on-ground observations.</p> <p>These bushfires were partially attributed to severe drought conditions in 2017–2019 in NSW leading to low fuel moisture content, leaf senescence and shedding, and lack of moist impediments to fire spread (Nolan et al. 2020).</p> |

| Threat | Status ^a | Evidence |
|---|--|--|
| Recreational/management activities | <ul style="list-style-type: none"> • Timing: future • Confidence: suspected • Likelihood: possible • Consequence: minor • Trend: static • Extent: across part of its range | <p><i>Styphelia psiloclada</i> grows near firetrails and walking tracks (ALA 2022). The species may therefore be susceptible to trampling by bushwalkers or physical damage by track maintenance.</p> <p>Disturbance from track construction and maintenance may also increase the risk of weed invasion in the species habitat and the likelihood of <i>Phytophthora cinnamomi</i> being introduced by bushwalkers or in gravel introduced during track upgrades (see Disease threat below).</p> |
| Climate change | | |
| Increased frequency of extreme temperatures, droughts and fire danger weather, and changes in precipitation | <ul style="list-style-type: none"> • Timing: current/future • Confidence: inferred • Likelihood: almost certain • Consequence: major • Trend: increasing • Extent: across the entire range | <p>The South East region of NSW is expected to undergo an increase in severe and average Forest Fire Danger Index values, which are used as an indicator of fire risk. These increases are projected for summer and spring which represent peak fire risk season (OEH 2014). These changes to fire conditions will likely increase the probability of frequent and high severity bushfires impacting <i>S. psiloclada</i> into the future.</p> <p>There is also a projected increase in minimum and maximum temperatures (maximum temperature increases of 0.5–1.0°C by 2039 and 1.8–2.5°C by 2060–2079) and an increase in the number of hot days. Rainfall is projected to decrease in spring and winter and increase in summer and autumn (OEH 2014).</p> <p>The impact of drought on <i>S. psiloclada</i> is uncertain. However, generally drought may cause widespread plant mortality in forest ecosystems, as many plants are vulnerable to drought stress and hydraulic failure of their vascular system (Allen et al. 2010; Choat et al. 2012; De Kauwe et al. 2020).</p> <p>Gallagher (2022) found that 18 % of the species' modelled distribution was in severe drought in the 12 months preceding the 2019-20 bushfires which may impact on the species' ability to regenerate. Post-fire recruitment and seedling survival can be threatened by drought, as environments with higher precipitation may have greater capacity to regenerate compared to environments where drought conditions are present pre- or post-fire (Auld 2020).</p> <p>Warmer temperatures, changes to precipitation patterns and fire interactions may also favour the spread and increase severity of <i>Phytophthora cinnamomi</i> infection (Moore et al. 2015; Homet et al. 2019).</p> |

| Threat | Status ^a | Evidence |
|---------------------------------------|---|--|
| Disease | | |
| Dieback caused by <i>P. cinnamomi</i> | <ul style="list-style-type: none"> • Timing: future • Confidence: suspected • Likelihood: possible • Consequence: major • Trend: unknown • Extent: across part of its range | <p><i>Phytophthora cinnamomi</i> is an introduced soil-borne pathogen, which infects a large range of plant species and may contribute to plant death, especially when other stressors are present, such as waterlogging, drought and fire (DOEE 2018). <i>Phytophthora cinnamomi</i> can migrate through zoospores via soil moisture/water and by direct hyphal infection from susceptible species with infected roots and mud clinging to vehicles, animals and walkers and movement of infected plant materials or soil (DOEE 2018). Dieback caused by <i>P. cinnamomi</i> is listed as a Key Threatening Process under the EPBC Act (DOEE 2018).</p> <p>The susceptibility of <i>S. psiloclada</i> to <i>P. cinnamomi</i> is unknown and there is no evidence of the disease impacting on the species. However, the Ericaceae are known to include highly susceptible species and at least one species of <i>Styphelia</i> is known to be susceptible to the disease (Schahinger et al. 2003). Therefore, dieback from <i>P. cinnamomi</i> is inferred as a potential threat to <i>S. psiloclada</i>.</p> <p><i>Styphelia psiloclada</i> grows near walking tracks and firetrails and are therefore susceptible to the pathogen being introduced by bushwalkers or in gravel introduced during track upgrades.</p> |
| Invasive species | | |
| Browsing by feral herbivores | <ul style="list-style-type: none"> • Timing: future • Confidence: suspected • Likelihood: possible • Consequence: minor • Trend: unknown • Extent: across part of its range | <p>Browsing by feral herbivores could be a potential threat to <i>S. psiloclada</i>, particularly by feral goats (<i>Capra hircus</i>) and European rabbits (<i>Oryctolagus cuniculus</i>) that can access the steep terrain within the species' range. Feral herbivores including goats are targeted by aerial control operations in Wadbilliga NP (NPWS 2022) indicating that they are a nuisance species. European rabbits are also likely to occur in low densities in the region (OEH 2013).</p> <p>Impacts associated with feral goats and European rabbits are listed as Key Threatening Processes under the EPBC Act (DOEE 2016; DEWHA 2008).</p> |

^aTiming—identifies the temporal nature of the threat

Confidence—identifies the nature of the evidence about the impact of the threat on the species

Likelihood—identifies the likelihood of the threat impacting on the whole population or extent of the species

Consequence—identifies the severity of the threat

Trend—identifies the extent to which it will continue to operate on the species

Extent—identifies its spatial context in terms of the range of the species

^bFire 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

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

Each threat has been described in Table 2 in terms of the extent that it is operating on the species. The risk matrix (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

| Likelihood | Consequences | | | | |
|----------------|-----------------|--|----------|---|--------------|
| | Not significant | Minor | Moderate | Major | Catastrophic |
| Almost certain | | | | Fire regimes that cause declines in biodiversity Increased frequency of extreme temperatures, droughts and fire danger weather, and changes in precipitation | |
| Likely | | | | | |
| Possible | | Recreational and management activities Browsing by feral herbivores | | Dieback caused by <i>Phytophthora cinnamomi</i> | |
| Unlikely | | | | | |
| Unknown | | | | | |

Risk Matrix legend/Risk rating:

| | | | |
|----------|---------------|-----------|----------------|
| Low Risk | Moderate Risk | High Risk | Very High Risk |
|----------|---------------|-----------|----------------|

Priority actions have then been developed to manage the threats, particularly where the risk was deemed to be ‘very high’ (red shading) or ‘high’ (orange shading). For those threats with an unknown or low risk (blue and green shading respectively) research and monitoring actions have been developed to understand and evaluate the impact of the threats, where appropriate.

Conservation and recovery actions

Primary conservation objective

By 2032, the population of *S. psiloclada* will be stable and sustained in habitats in which key threats are managed effectively.

Conservation and management priorities

Fire impacts

- Develop and implement a fire management strategy that maintains an appropriate fire regime for the species, that protects all subpopulations burnt during fires (including planned burns and bushfires) from further fire (including planned burns and bushfires) for at least 10 years (i.e., the minimum fire interval) until seedlings and regrowth matures, and the soil-stored seed bank is rebuilt. Control the impacts of herbivory and seed predation in recently burnt habitat.
- Avoid impacts to subpopulations during fire-fighting operations, or other fire management works, by ensuring accurate species location information is available to relevant fire management agencies.

Habitat loss, disturbance and modifications impacts

- Ensure locations of subpopulations are kept updated on state databases including those used by fire and land management agencies.
- If required, install signs and possibly barriers to prevent trampling and damage during track maintenance at sites near walking tracks.

Disease impacts

- Determine the susceptibility of *S. psiloclada* to *P. cinnamomi*.
- If appropriate, implement a hygiene management plan and risk assessment to protect known subpopulations from introduction of new isolates of *P. cinnamomi* or other pathogens.
- As a precaution, ensure that appropriate hygiene protocols are adhered to when entering or exiting the known locations of *S. psiloclada*, such as those outlined in the *Arrive Clean, Leave Clean. Guidelines to help prevent the invasive plant diseases and weeds threatening our native plants, animals and ecosystems* (Commonwealth of Australia 2015).
- Ensure that areas where the species is known to occur that are free of *P. cinnamomi* are sign posted and hygiene stations are implemented and maintained.

Ex situ recovery actions

- To manage the risk of losing genetic diversity, undertake appropriate seed collection and storage in appropriate institutions (such as the NSW Plantbank Royal Botanic Gardens Sydney). Best practice seed storage guidelines and procedures should be adhered to, to maximise seed viability and germinability (refer to Martyn Yenson et al. 2021). Seeds from all major natural subpopulations should be collected and stored.
- Undertake research on the species' seed germination requirements and viability (see also 'Information and research priorities' section below).

- If appropriate, undertake ex situ propagation and translocations in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Commander et al. 2018). Translocations should be monitored to document recruitment and show that the translocated subpopulation(s) are self-sustaining and contribute to the conservation of the species.

Invasive species impacts

- If there is evidence of browsing and/or habitat destruction by feral herbivores reduce these impacts through well-maintained fencing, where suitable, and/or through ongoing control programs. Further actions are outlined in the Threat abatement plan for competition and land degradation by unmanaged goats (DEWHA 2008) and the Threat abatement plan for competition and land degradation by rabbits (DOEE 2016).

Stakeholder engagement/community engagement

- 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.
- Work with Traditional Owners to implement conservation actions, including Indigenous fire management practices and other survey, monitoring and management actions.
- Liaise with the local community and government agencies to ensure that up-to-date population data and scientific knowledge inform the implementation of conservation actions for this species.
- Coordinate protection and recovery actions with non-government stakeholders (e.g. Landcare and bush regeneration groups, landowners and managers) as well as with Local and State government environmental field and extension officers.
- Inform managers of sites where there are known subpopulations and consult with these groups regarding options for conservation management and protection of the species.

Survey and monitoring priorities

- Establish and maintain a survey and monitoring program to:
 - locate and record all known subpopulations including in adjacent and similar habitat,
 - confirm occurrence of unvouchered plants on private property near Nerriga,
 - locate suitable sites for translocations,
 - determine population size and trends of all subpopulations, particularly seedling survival and recovery from the 2019–20 bushfires,
 - determine habitat conditions, particularly the health of individuals in unburnt habitat,
 - assess threats and their impacts, including the effect of fire on the life-cycle on the species, and

- monitor the effectiveness of management actions and the need to adapt them if necessary.

Information and research priorities

- Map habitat critical to the survival of the species and identify any critical habitat on Commonwealth land.
- Investigate the population genetics and pollination biology of the species.
- Investigate recruitment (including seed biology, dormancy mechanisms, germination requirements, the length of the primary and secondary juvenile periods), seedling survival and plant longevity.
- Identify fire regimes that are detrimental and those that allow population persistence.
- Map the exposure of the species to climate change using distribution modelling and climate change projections, to locate existing habitat patches and identify future habitat that would be suitable for the species.
- Undertake vulnerability assessments of the species' sensitivity and adaptive capacity to changing climate conditions which draw from genetic, physiological or ecological evidence.

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.

[Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* \(2018\)](#)

[Threat abatement plan for competition and land degradation by unmanaged goats \(2008\)](#)

[Threat abatement plan for competition and land degradation by rabbits \(2016\)](#)

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DRAFT

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee finalised this assessment on DD Month Year.

Attachment A: Listing Assessment for *Styphelia psiloclada*

Reason for assessment

This assessment follows prioritisation of a nomination from the Threatened Species Scientific Committee.

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

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|------------------------------|---------------------------------|-------------------------|-------------------------|--|
| Number of mature individuals | unknown | unknown | unknown | The number of mature individuals is unknown because there are no data available to support an estimation of population size for any subpopulation. |
| Trend | unknown | | | The population trajectory of the species is unknown due to the lack of pre-fire and post-fire surveys across all known subpopulations and a limited understanding of post-fire recovery. |
| Generation time (years) | 23.5 | 21.5 | 25.5 | Based on other species within the same family and genus, the time to reproductive maturity is estimated at 3–11 years and longevity is estimated at 40 years (see Relevant biology and ecology section). Following the IUCN guidelines for calculating generation length, the generation time is in the range of 21.5–25.5 (see Criterion 1). The estimate used in this assessment represents a midpoint between the minimum and maximum range. |

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|--|--|--------------------------------|--------------------------------|---|
| Extent of occurrence | 392 km ² | 392 km ² | 1978 km ² | <p>The minimum plausible value is the estimate used in the assessment. This was attained by mapping point records from 1995–2014, obtained from state governments, herbarium collections, and other sources. The EOO was then calculated using a minimum convex hull over these areas (IUCN 2022).</p> <p>The maximum value for this taxon could be up to 1978 km² if all known records for the species dating back to 1985 are considered using the criteria described above.</p> <p>All values are within the range of the Endangered category of Criterion 2.</p> |
| Trend | unknown | | | <p>The trend in EOO is unknown due to the lack of historical and post-fire surveys and a limited understanding of post-fire recovery.</p> |
| Area of Occupancy | 32 km ² | 32 km ² | 52 km ² | <p>The minimum plausible value is the estimate used in the assessment. This attained by mapping cleaned point records from 1995–2014, obtained from state governments, herbarium collections, and other sources. The AOO was then calculated using a 2x2 km grid cell method over these points, based on the IUCN Red List Guidelines (IUCN 2022).</p> <p>The maximum value for this taxon could be up to 52 km² if all known records for the species dating back to 1985 are considered using the criteria described above.</p> <p>All values are within the range of the Endangered category of Criterion 2.</p> |
| <p>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).</p> | | | | |
| Trend | Unknown | | | <p>The trend in AOO is unknown due to the lack of historical and post-fire surveys and a limited understanding of post-fire recovery.</p> |

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|--|--|-------------------------|-------------------------|--|
| Number of subpopulations | 3 | 3 | 3+ | The species appears to occur in three distinct subpopulations based on distribution across three national parks (see Table 1). Other undiscovered subpopulations may also exist and/or there may be divisions within the broad areas where the species occurs i.e. within each of the National Parks. |
| Trend | Unknown | | | The trend in subpopulations is unknown due to the lack of any surveys in the species distribution, and a limited understanding of post-fire recovery. |
| Basis of assessment of subpopulation number | <p>The species appears to occur in three distinct areas - Morton NP, over 100 km southwest in Wadbilliga NP and in South East Forest NP approximately 50 km further south (ALA 2022). These are considered far enough apart to comprise distinct subpopulations.</p> <p>However, as herbarium collections and observations are the only available records for the species, it is difficult to determine how widespread plants are outside these records and therefore whether additional subpopulations exist. There may also be divisions within the broad areas where the species occurs i.e. within each of the National Parks which would lead to a higher number of subpopulations.</p> | | | |
| No. locations | 3 | 3 | 3+ | <p>Fire regimes that cause declines in biodiversity are the most serious threat to the species.</p> <p>The 2019-20 bushfires overlapped 52% percent of the species modelled distribution (and 86% of AVH occurrences) (Gallagher 2022). If <i>S. psiloclada</i> is an obligate seeder (see 'Relevant Biology and Ecology' above), then another fire in the near future may impact immature plants before they are able to adequately replenish the soil seed bank.</p> <p>It is possible, although perhaps unlikely, that a single fire could impact all three subpopulations, but it is reasonable to assume single fires could impact each subpopulation separately. Therefore, the number of locations has been estimated as 3.</p> <p>The maximum plausible value could be greater if other subpopulations are located in regions not currently known.</p> |
| Trend | Unknown | | | |
| Basis of assessment of location number | The number of locations is based on the most plausible serious threat of fire impacting each subpopulation separately. | | | |
| Fragmentation | <p>Unknown. A taxon can be considered to be severely fragmented if most (>50%) of its total area of occupancy is in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance relative to dispersal distance of the species (IUCN 2022). <i>S. psiloclada</i> subpopulations are separated by at least 50 km which may limit seed dispersal and gene flow between these subpopulations. However, as there is no information on the number of individuals, the viability of each subpopulation is unknown.</p> | | | |

Styphelia psiloclada Conservation Advice

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|---------------------|--|--------------------------------|--------------------------------|----------------------|
| Fluctuations | Unknown. The number of mature individuals is likely to fluctuate following fire. However, based on available information, it is not possible to determine if the species exhibits extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals. | | | |

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 | | | |
|--|--|---|-------------------------------------|
| | Critically Endangered Very severe reduction | Endangered Severe reduction | Vulnerable Substantial reduction |
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3, A4 | ≥ 80% | ≥ 50% | ≥ 30% |
| <p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> | | <p>Based on any of the following</p> <ul style="list-style-type: none"> (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites | |

Criterion 1 evidence

Insufficient data to determine eligibility

Generation time

The generation length and longevity are unknown for *S. psiloclada*. However, estimates from other species within the same family and genus can be used to infer the generation length. The time to reproductive maturity is estimated at 3–11 years and longevity is estimated at 40 years (see Relevant biology and ecology section). Following the IUCN guidelines for calculating generation length, the generation time is in the range of:

$$\text{Generation time} = \text{age of first reproduction} + [0.5 * (\text{length of reproductive period})]$$

$$\text{Generation time} = 3 + [0.5 * (40 - 3)] = 21.5 \text{ years}$$

OR

$$\text{Generation time} = 11 + [0.5 * (40 - 11)] = 25.5 \text{ years}$$

This gives an estimated three-generation period of approximately 64.5 – 76.5 years. The estimate used in this assessment of 70.5 represents a midpoint between the minimum and maximum range.

Descriptions from herbarium collections indicate that the species is 'uncommon' and 'occasional' (ALA 2022). This implies that the species is likely to be localised at the majority of known subpopulations. However, the species mainly occurs in remote, difficult to access terrain and is likely to be more widespread than currently known. Despite this, there are no estimates of population size for any subpopulation and no data on population trends through time.

Therefore, the Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

| | Critically Endangered Very restricted | Endangered Restricted | Vulnerable Limited |
|---|--|--------------------------|--------------------------|
| B1. Extent of occurrence (EOO) | < 100 km ² | < 5,000 km ² | < 20,000 km ² |
| B2. Area of occupancy (AOO) | < 10 km ² | < 500 km ² | < 2,000 km ² |
| AND at least 2 of the following 3 conditions: | | | |
| (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 | | | |

Criterion 2 evidence

Insufficient data to determine eligibility

AOO and EOO

The most plausible AOO and EOO of *S. psiloclada* are estimated at 32 km² (AOO range is 32 km²–52 km²) and 392 km² (EOO range is 392 km²–1978 km²) respectively. Therefore the species' AOO and EOO are considered restricted (Endangered) for the purposes of this criterion.

Although surveys could reveal new subpopulations of the species, they are unlikely to increase the AOO and EOO estimates beyond the relevant thresholds that support the species listing under this criterion as Endangered.

Severe fragmentation or number of locations

Styphelia psiloclada subpopulations are separated by at least 50 km (ALA 2022), which is likely to limit pollination and gene flow between these subpopulations. However, as there is no information on the number of individuals, the viability of each subpopulation is unknown. Therefore its unknown whether the species is severely fragmented (see Table 4).

Fire regimes that cause declines in biodiversity are the most serious threat to the species (see Table 4). It is possible, although perhaps unlikely, that a single fire could impact all three subpopulations, but it is reasonable to assume single fires could impact each subpopulation separately. Therefore, the number of locations has been estimated as three.

Continuing decline

The main current threats to the species include increased fire frequency and severity, and out-of-season fires (Table 2). The species is also threatened by drought and the interactions between fire and drought (Table 2). However, as the fire response of *S. psiloclada* is unknown and there has been no surveying through time of any subpopulations, it is difficult to determine how these threats impact on the species. Therefore, there are insufficient data available to judge whether these threats would make the species' geographic distribution precarious for its survival.

Extreme fluctuations

Extreme fluctuations represent changes in the total population (rather than a flux of individuals between different life stages), which exceed one order of magnitude (IUCN 2022). Extreme fluctuations can be diagnosed by interpreting population trajectories, which show a recurring pattern of increases and decreases; or by using life history characteristics (IUCN 2022)

The number of mature individuals is likely to fluctuate following fire. However, based on available information, it is not possible to determine if the species exhibits extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals.

Conclusion

Following assessment of the data the Committee has determined that the species' geographic distribution is restricted, and the number of locations is less than five. However, there are insufficient data available to judge whether there are threats operating that would make the species geographic distribution precarious for its survival. There are also insufficient data to determine whether the species is severely fragmented or subject to extreme fluctuations. Therefore, the species has not met the required elements of 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: | | | |
| (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 | | | |

Criterion 3 evidence

Insufficient data to determine eligibility

There are no available data on population size. There are no temporal data (i.e. repeated monitoring) to show population trends or decline for any subpopulation. Thus, it is not possible to assess if there has been a population size reduction in the number of mature individuals because of the 2019-20 bushfires, or if the population is recovering following the fires. Therefore, there is insufficient evidence to meet 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 |
|--|--|------------------------|--|
| D. Number of mature individuals | < 50 | < 250 | < 1,000 |
| D2. ¹ <i>Only applies to the Vulnerable category</i> 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 | | | D2. Typically: area of occupancy < 20 km ² or number of locations ≤ 5 |

¹ 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

Insufficient data to determine eligibility

There are no available data on population size. Therefore, the Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category 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 |

Criterion 5 evidence

Insufficient data to determine eligibility

Population viability analysis has not 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 tentative at this stage, as it may be changed as a result of responses to this consultation process.

Adequacy of survey

The survey effort is not considered adequate and there is insufficient 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 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.

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Department of Agriculture, Water and the Environment

GPO Box 858, Canberra ACT 2601

Telephone 1800 900 090

Web awe.gov.au

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