Australian Government
Department of Agriculture, Water and the Environment

# Consultation on Species Listing Eligibility and Conservation Actions

## *Rhodanthe* sp. Point Lookout

You are invited to provide your views and supporting reasons related to:
1) the eligibility of *Rhodanthe* sp. Point Lookout for inclusion on the EPBC Act threatened species list in the 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@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 2 March 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:

http://www.awe.gov.au/system/files/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 Rhodanthe sp. Point Lookout (Common Name)

### SECTION A - GENERAL

1. Is the information used to assess the nationally threatened status of the species/subspecies 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/subspecies? 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/SUBSPECIES? (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. Can you provide any additional information on pollination ecology or dispersal mechanisms for the species?

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

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

### Population size

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

8. 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/subspecies? If not, please provide justification for your response.

9. If not, can you provide a further estimate of the current population size of mature adults of the species/subspecies (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/subspecies 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/SUBSPECIES? (If no, skip to section E)

10. 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

11. Are you able to provide an estimate of the total population size during the early 2000s *(at or soon after the start of the most recent three generation period)*? 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/subspecies 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

12. Are you able to comment on the extent of decline in the species/subspecies' total population size over the last approximately 20 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

13. 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/SUBSPECIES? (If no, skip to section F)**

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

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

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

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

17. 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.

18. 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 km$^2$ ☐ 100 – 5 000 km$^2$ ☐ 5 001 – 20 000 km$^2$ ☐ >20 000 km$^2$

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 km$^2$ ☐ 11 – 500 km$^2$ ☐ 501 – 2000 km$^2$ ☐ >2000 km$^2$

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/SUBSPECIES? (If no, skip to section G)

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

19. Do you consider that the way the historic distribution has been estimated is appropriate? Please provide justification for your response.

20. 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 $km^2$ ☐ 100 – 5 000 $km^2$ ☐ 5 001 – 20 000 $km^2$ ☐ >20 000 $km^2$

    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 $km^2$ ☐ 11 – 500 $km^2$ ☐ 501 – 2000 $km^2$ ☐ >2000 $km^2$

    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/SUBSPECIES? (If no, skip to section H)

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

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

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

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

25. 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/SUBSPECIES? (If no, skip to section I)

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

27. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species/subspecies?

28. Would you recommend translocation (outside of the species' historic range) as a viable option as a conservation actions for this species/subspecies?

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

29. 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?

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

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

32. How aware of this species/subspecies are land managers where the species/subspecies is found?

33. What level of awareness is there with individuals or organisations around the issues affecting the species/subspecies?

    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

34. Do you have comments on any other matters relevant to the assessment of this species/subspecies?

# Conservation Advice for *Rhodanthe* sp. Point Lookout (J.J Bruhl 2078)

**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 approved conservation advice and listing assessment for the species. It provides a foundation for conservation action and further planning.

*Rhodanthe* sp. Point Lookout (J.J Bruhl 2078) © Copyright John Hunter (from DPIE 2021)

# Conservation status

*Rhodanthe* sp. Point Lookout (J.J Bruhl 2078) (hereafter *Rhodanthe* sp. Point Lookout) (Asteraceae) is proposed to be listed in the Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999.*

*Rhodanthe* sp. Point Lookout was assessed by the Threatened Species Scientific Committee to be eligible for listing under as Endangered under criterion 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: Insufficient data
- Criterion 2: B1ab(iii)+2ab(iii): Endangered
- Criterion 3: Insufficient data
- Criterion 4: Insufficient data
- Criterion 5: Insufficient data

The main factors that make the species eligible for listing in the Endangered category are a limited extent of occurrence (EOO) and area of occupancy (AOO); low number of locations (two); and continuing decline in the quality of the species' habitat.

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 Threat Database.

# Species information

## Taxonomy

The taxon has not yet been formally described. It is currently known under the informal phrase name of *Rhodanthe* sp. Point Lookout (J.J Bruhl 2078). The species is accepted by the Australian Plant Census (APC 2021), and there are four specimens held at herbaria (AVH 2021), though none at NSW herbarium. The species is in the Asteraceae family. It may be closely related to *Rhodanthe anthemoides* (chamomile sunray), as chamomile sunray is the only perennial *Rhodanthe* in New South Wales (NSW) and the only member of the genus that has been recorded in northeast NSW (PlantNet 2021).

## Description

The species has not yet been formally described, so a brief description has been drawn from available images. *Rhodanthe* sp. Point Lookout is a sprawling, semi-woody herb (suggesting it is probably perennial) with stems 30 to 50 cm long, alternate linear leaves and white flowers with purple bracts (AVH 2021).

## Distribution

*Rhodanthe* sp. Point Lookout occurs at Apsley Falls (two sites, A and B; c. 20 km east of Walcha; ALA 2021), Steep Drop Falls (30 km east of Walcha; ALA 2021), Point Lookout (c.10 km south of Ebor; Heenan et al. 2013) and Darkie Point (c. 8km south-east of Ebor) (Map 1).

As the species is found on cliffsides and in crevices on cliff faces at sites that are difficult to reach, it may be more widespread than current records suggest.

*Tenure*

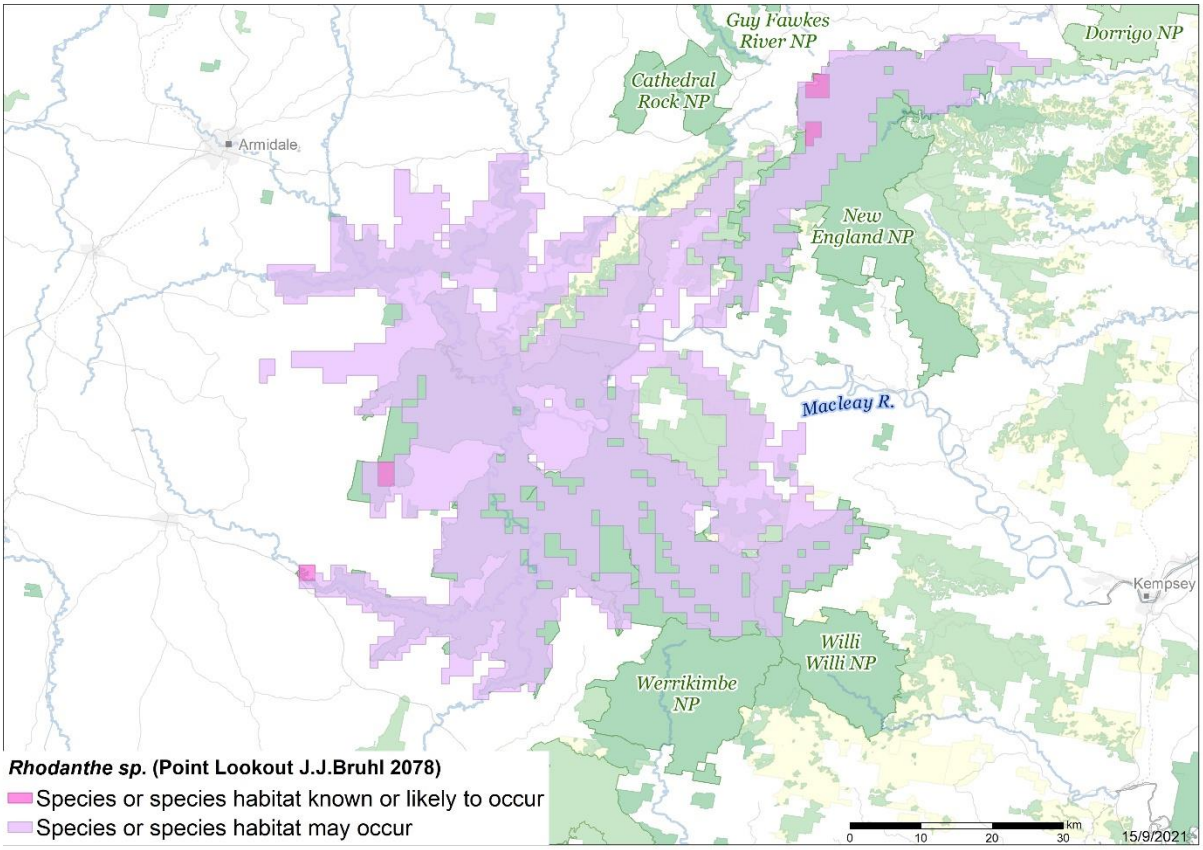
The Apsley Falls and Steep Drop Falls sites are found within Oxley Wild Rivers National Park (OWRNP). Point Lookout and Darkie Point are found within New England National Park (NSW Government 2021).

*Subpopulations*

Information on subpopulation sizes is limited, especially for the Point Lookout and Darkie Point sites. Surveys of Apsley Falls and Steep Drop Falls were conducted after the 2019–20 bushfires (DPIE 2021), though these were compromised by the dangerous terrain on which the species is found, and only small sections of habitat could be appropriately searched (DPIE 2021). At Apsley Falls site B, the cliff edges were too dangerous to approach and surveys could not be conducted. It is suggested that further surveys could be conducted using drones (DPIE 2021).

At Apsley Falls site A, surveys identified 28 individuals in protected sites on cliff faces, though there are likely many more plants that could not be sighted due to poor conditions and inaccessibility. It is likely that the population is of 'reasonable size' (DPIE 2021). At Steep Drop Falls, foggy conditions and the presence of individuals over cliff edges reduced accessibility, though plants were again seen in crevices, as well as opposite the cliff face and on the edge of a waterfall. Steep Drop Falls was also burnt by high severity fire in 2019-20, though whilst the edges of cliffs and surrounding forest were burnt, the cliff crevices in which many *Rhodanthe* sp. Point Lookout plants were located appeared to be unaffected (DPIE 2021). It is unknown how many mature plants there are at this site, or if there are any post-fire seedlings. All other known sites appear to be unburnt after the 2019–20 bushfires (NSW Government 2021).

**Map 1 Modelled distribution of *Rhodanthe* sp. Point Lookout**




**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 specific habitat type or geographic feature that represents to recent observed locations of the species (known to occur) or preferred 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

This section describes some published examples of this significance but is not intended to be comprehensive, applicable to, or speak for, all Indigenous Australians. Such knowledge may be only held by Indigenous Australians who are the custodians of this knowledge.

The cultural and community significance of *Rhodanthe* sp. Point Lookout is unknown. However, New England NP includes the traditional lands of the Dunghutti, Anaiwan and Gumbaynggirr Peoples, and Point Lookout is a sacred location known as 'Berarngutta', translated to 'prohibited area'. It is a men-only place, and some Indigenous Australian women continue to avoid the area (NSW NPWS 2021). Apsley Falls is also significant to Indigenous Australians, and Dunghutti people tell the story of how the Rainbow Serpent created the gorge in the Dreamtime. It is said that The Rainbow Serpent travelled down to earth at the site and moved underground from the base of the falls to reappear 20 km upstream at the Mill Hole on the Apsley River in Walcha

(Waterfall Way 2008; Trees 2018). Aside from the cultural significance of the site, explorer John Oxley passed by the falls on 13 September 1818 and named them Bathurst Falls. He described it as "one of the most magnificent waterfalls we have seen" (Walcha Council 2021a).

Darkie Point also has cultural significance, as it was the site of a massacre of Indigenous Australians in May 1841 (UON 2019).

Investigating the significance of *Rhodanthe* sp. Point Lookout is a research priority identified in the conservation actions.

## Relevant biology and ecology

*Habitat ecology*

At Apsley Falls and Steep Drop Falls, the species is found in rocky protected sites on cliff faces, along cliff lines, on waterfall edges and in crevices opposite the cliff face (DPIE 2021). Known habitat is adjacent to eucalyptus forest, and at Point lookout, associated species include *Gingidia rupicola* and *Gaultheria viridicarpa* (green waxberry). *Vesselowskya rubifolia* (southern marara), *Xerochrysym* sp. Point Lookout (I.R. Telford 12830), *Coronidium elatum* subsp. *minus* (white paper daisy), *Wahlenbergia telfordii* and *Wahlenbergia rupicola* are also present in the area (Heenan et al. 2013).

All subpopulations are exposed to short mild summers and long cold winters. At Walcha (nearby the Apsley Falls and Steep Drop Falls sites), monthly maximum temperatures vary from 11.7°C – 25.4°C and monthly minimum temperatures vary from 2.9°C – 12.5°C. Average annual rainfall is 815mm, with the wettest months occurring during Summer (Walcha Council 2021b). At Dorrigo (c. 35 km from Point Lookout), mean annual rainfall is 1897 mm, with monthly maximum temperatures varying from 14.7°C – 24.6°C and monthly minimum temperatures varying from 4.5°C – 15°C (BOM 2021).

*Reproduction and life history*

The reproductive ecology of *Rhodanthe* sp. Point Lookout is unknown, though it is likely similar to other members of the *Rhodanthe* genus. Germination and crossing experiments conducted on four *Rhodanthe* species by Salmon (1995) found that members of the genus are obligate outbreeders, and the combination of brightly coloured flowers, protandry (male organs developed prior to female organs in the same plant), elaborate pollen presentation systems and self-incompatibility suggests that the genus is likely adapted for insect pollination. However, it is unclear if different *Rhodanthe* taxa are adapted to certain insect species. *Rhodanthe* species appear to be able to form persistent seed banks (Scott & Morgan 2012) with dormant and readily germinable seeds (Bell 1995). However, it is unclear how long seeds *Rhodanthe* sp. Point Lookout seeds persist in the soil.

*Rhodanthe* seeds appear to be physiologically dormant and are highly responsive to light and temperature for germination (Plummer & Bell 1995; Hoyle et al. 2008, cited in Ha & Johnstone 2013; Scott & Morgan 2012; Epee Misse 2019). Plummer & Bell (1995) found that germination of three *Rhodanthe* taxa were stimulated by light, whilst germination of one species was inhibited by gibberellic acid (a growth regulating hormone). However, Epee Misse (2019) found that germination of *Rhodanthe floribunda* (common white sunray) seeds was stimulated both by

light and gibberellic acid, and Bunker (1994) reported that gibberellic acid stimulated germination in two other *Rhodanthe* species.

It is unclear if germination of *Rhodanthe* seeds is stimulated by fire. *Rhodanthe anthemoides* has been observed to be 'common after fire or disturbance' (Plants of South Eastern New South Wales 2021) and germination of *Rhodanthe citrina* was increased by the addition of butenolide (an organic compound found in smoke) (Merritt et al. 2006). However, the same study identified that germination was suppressed by the addition of smoke water (possibly due to toxic components of smoke water; Drewes et al. 1995), and the germination of the genus is considered to be suppressed by the application of smoke (SGAP 1995). In a study on post-fire species composition, common white sunray was not observed until 2.5 years after fire (Cohn et al. 2002), suggesting it is not a post-fire opportunist. The response of *Rhodanthe* sp. Point Lookout seeds to fire is unclear and requires further research.

The timing of *Rhodanthe* spp. flowering is affected by light and temperature, and inappropriate light and high temperature conditions have been observed to reduce the number of flowers in multiple *Rhodanthe* species (Bunker 1995). Common white sunray and *Rhodanthe chlorocephala* subsp. *rosea* are facultative long day plants, where floral initiation occurs under any day length but is accelerated by long days and is inhibited when temperatures are too high (> 25°C) (Sharman et al. 1989; 1990; Bunker 1995). Similarly, Roberts (2005) identified that low minimum temperatures (below 10°C) during April, May and June plantings of common white sunray reduced the time to the first visible bud initiation, suggesting low temperatures promoted early flowering of the species. Ha & Johnstone (2013) confirmed this, finding that common white sunray plants that were chilled for longer were more likely to flower, and suggested the species has a facultative requirement for flowering in response to low temperatures. Given the ecology of this and other *Rhodanthe* species, *Rhodanthe* sp. Point Lookout germination and flowering is also likely dependent on the effects of light and temperature.

## Habitat critical to the survival

At this point in time there is insufficient information available to describe, with spatial information, areas of habitat that are critical to the survival of the species. Further research is needed to do this (see conservation actions). Until such information is available, all habitat for this species in all known extant and historical subpopulations should be considered important for the species' long-term survival.

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, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation

At this point in time there is insufficient information available to be able to describe, with spatial information, important populations of this species. Further research is needed to do this, if practicable to do so (see conservation actions). Until such information is available, all populations of this species should be considered important.

## Threats

The threats to *Rhodanthe* sp. Point Lookout are poorly understood, though it is likely threatened by climate change through extreme weather events, drought and bushfires. It may also be threatened by Unmanaged (feral) goats (*Capra hircus*).

### Table 1 Threats impacting *Rhodanthe* sp. Point Lookout

Threats in Table 1 are noted in approximate order of highest to lowest impact, based on available evidence.

| Threat | Status [a] | Evidence |
|---|---|---|
| Feral animals | | |
| Disturbance and grazing by feral goats | • Timing: current<br>• Confidence: inferred<br>• Consequence: major<br>• Trend: unknown<br>• Extent: across part of its range | Feral goats are found in all states and territories of Australia and have been listed as a Key Threatening Process under the EPBC Act (DEWHA 2008). They are often found on rocky outcrops, steep slopes, gullies and ravines (Agriculture Victoria 2021), and are therefore more likely to browse on and disturb *Rhodanthe* sp. Point Lookout plants compared to other feral herbivores. Feral goat herds can have a major impact on native plant communities through soil damage and overgrazing of herbs, grasses, shrubs and trees (DSEWPC 2011), causing erosion and preventing plant regeneration (DEWHA 2008; DPI 2021). Feral goats may also spread weeds and diseases (Bayne et al. 2005; DEWHA 2008).<br>Currently, Feral goats are known to be present at Apsley Falls (DPIE 2021), though as of June 2021, there was no evidence of browsing impacts on *Rhodanthe* sp. Point Lookout. It is unknown if they are present at the other known *Rhodanthe* sp. Point Lookout sites. Small Feral goat subpopulations are found in in OWNRP, though are confined to the upper Chandler, Styx, Oaky, Warnes and Apsley River gorge areas, and controlled by ground and aerial shooting (NSW NPWS 2005). They are present in more than 30 reserves within the Northern Tablelands region, though the density and distribution varies between reserves depending on a variety of factors, including pest control (OEH 2012). Investigating the presence and impact of feral goats at known sites is an important research priority outlined in the conservation actions. |
| Climate Change | | |
| Changes to temperature and precipitation patterns | • Timing: current<br>• Confidence: known<br>• Consequence: moderate<br>• Trend: increasing<br>• Extent: across the entire range | The CSIRO & Bureau of Meteorology (2015) project the eastern coast of Australia will undergo elevated temperatures and increased frequency and severity of droughts due to climate change. These climatic changes are evidenced by the catastrophic drought conditions in eastern Australia from early 2017 to late 2019 (BOM 2021; Wittwer & Waschik 2021). Drought conditions are known to induce mortality and population decline in herbaceous plants, and previous research on the related *Rhodanthe chlorocephala* subsp. *rosea* found that water deficit reduced flower production and seed yield (Choengsat et al. 1996). This suggests that drought conditions may negatively impact the reproductive output of *Rhodanthe* sp. Point Lookout, although further research is required to |

| | | |
|---|---|---|
| | | accurately determine the impact of drought on the species.<br><br>In New England, maximum and minimum temperatures are projected to increase by 0.7°C by 2030, and 2.2°C–2.3°C by 2070, with more hot days and fewer cold nights (DPIE 2014). Given that *Rhodanthe* sp. Point Lookout is an herb that may require longer periods of cold conditions for germination and flowering (see *Reproduction* above), temperature increases may lead to changes in flowering period and floral growth. Elevated temperatures caused by climate change may shorten flowering period of herbs that require cool temperatures (Nam & Kim 2020). Such changes to flowering timing may result in a mismatch with insect pollinator presence (Richardson et al. 2013) and have an impact on species level fitness (Nam & Kim 2020). |
| Increasing severity and frequency of bushfire events | • Timing: current<br>• Confidence: known<br>• Consequence: moderate<br>• Trend: increasing<br>• Extent: across parts of its range | Climate projections for eastern Australia include more frequent and intense bushfires as a result of increases in the Forest Fire Danger Index (CSIRO & Bureau of Meteorology 2015). These changes to fire conditions are evidenced by the catastrophic bushfires of 2019–20, in which an unusually large area of eastern Australia burned at high severity. Gallagher (2020) suggests that approximately 22% of the *Rhodanthe* sp. Point Lookout modelled range was burnt by the fires, and one of the four known subpopulations has been found to be fire-impacted in pos-fire surveys (DPIE 2021). However, surveys have also identified that many plants at the fire affected site were not burnt due to protection by offered by its habitat in rocky crevices (DPIE 2021).<br>New England is expected to undergo a continuing increase in severe and average Forest Fire Danger Index values, and these changes to fire conditions will likely increase the probability of frequent and high severity bushfires impacting the species in the future (OEH 2014). It is suspected that future high severity fire events would negatively impact this species through the mortality of individuals and reductions to habitat quality as a result of fire. For example, fire may facilitate weed invasion which may outcompete native vegetation in disturbed areas (D'Antonio & Vitousek 1992; Milberg & Lamont 1995; DPIPWE 2021).<br>It is unclear if *Rhodanthe* sp. Point Lookout regenerates from a soil-stored seed bank after fire, though germination of seed appears to be more dependent on temperature and light conditions than physical disturbance (see *Reproduction and life history*). If the species is partially dependent on post-fire seed recruitment for population growth and recovery, fire occurring too regularly or out of season may lead to failure of seed release and/or germination, failure of seedling establishment, interruption of maturation or developmental growth, and failure of seed production. Alternatively, subpopulations may also be threatened by too infrequent fire that allows plants to senesce and the seed bank to decline before recruitment occurs (Whelan 1995; Bond & van Wilgen 1996 Keith 1996) |
| Cliff collapse | • Timing: current<br>• Confidence: suspected | Cliff and escarpment collapse due to extreme weather events is an emerging threat for *Rhodanthe* sp. Point |

| | | |
|---|---|---|
| | • Consequence: moderate<br>• Trend: increasing<br>• Extent: across part of its range | Lookout, as the species is found exclusively on rocky outcrops, cliff faces and cliffsides (DPIE 2021). High rainfall events can lead to landslides and cliff collapse (Lieba 2011; Gariano 2016), and extreme rainfall events in the New England region of NSW are projected to increase in the near (2030) and far (2070) future due to climate change (Evans et al. 2014). These are within yearly variability in the near future, though significant increases in multiple extreme rainfall indices are projected by 2070. Climate change is projected to increase the frequency of landslips due to an increasing frequency of extreme rainfall events (Gariano 2016). Cliff and escarpment collapse may therefore become more common in the future as the probability of extreme rainfall events increases.<br><br>One site at Apsley Falls has recently undergone a landslide and part of the cliffside has collapsed (DPIE 2021). Any plants in the affected area have likely been destroyed, though it is unknown if *Rhodanthe* sp. Point Lookout has the ability to colonise disturbed soil after collapse events occur. |

Each threat has been described in Table 1 in terms of the extent that it is operating on the species. The risk matrix (Table 2) 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; 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 2 Risk Matrix for *Rhodanthe* sp. Point Lookout**

| **Likelihood** | **Consequences** | | | | |
|---|---|---|---|---|---|
| | **Not significant** | **Minor** | **Moderate** | **Major** | **Catastrophic** |
| **Almost certain** | Low risk | Moderate risk | Very high risk **Increasing severity and frequency of bushfires** | Very high risk | Very high risk |
| **Likely** | Low risk | Moderate risk | High risk **Changes to temperature and precipitation patterns** | Very high risk **Disturbance and grazing by feral goats** | Very high risk |
| **Possible** | Low risk | Moderate risk | High risk **Cliff destruction** | Very high risk | Very high risk |
| **Unlikely** | Low risk | Low risk | Moderate risk | High risk | Very high risk |
| **Unknown** | Low risk | Low risk | Moderate risk | High risk | Very high risk |

# Conservation and recovery actions

## Primary conservation objective

The population of *Rhodanthe* sp. Point Lookout increases in abundance and subpopulations are sustained in habitats in which very high risk threats are managed effectively.

## Conservation and management priorities

### Invasive species (including threats from grazing and trampling)

- Remove feral goats from the vicinity of subpopulations of *Rhodanthe* sp. Point Lookout, including through the use of aerial and ground shooting, mustering and trapping (DEWHA 2008).
- Install and maintain cages or fencing around subpopulations impacted by Feral goats to protect against grazing and habitat disturbance.

### Climate change and fire

- Implement a fire management strategy to protect all known subpopulations from inappropriate fire regimes, by excluding planned fire (and bushfire where possible) from all subpopulations until seedlings mature and the soil-stored seed bank is rebuilt.
- If required, undertake supplementary watering of post-fire seedlings to protect against drought-induced mortality.
- Identify and protect habitat modelled as being likely to remain or become suitable for *Rhodanthe* sp. Point Lookout due to the effects of climate change.

### Breeding, seed collection, propagation and other ex situ recovery action

- Collect and store sufficient quantities of seed from all known subpopulations in long-term storage to preserve genetic material, in accordance with the revised *Plant Germplasm Conservation Guidelines* (Martyn Yenson et al. 2021).
- If appropriate, undertake conservation translocations in suitable habitat with ongoing management and monitoring, to increase the number of self-sustaining subpopulations, in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia* (Commander et al. 2018).
- Use genomic approaches to understand population structure and use this data to inform translocation programs (Rossetto et al. 2021).

## Stakeholder engagement/community engagement

- Engage and involve Traditional Owners in conservation actions, including surveying for new populations.
- Liaise with relevant land managers to ensure that subpopulations are not accidentally damaged or destroyed. The approval and assistance of land managers should also be sought to implement recovery actions, and recent population data should inform management.

### Survey and monitoring priorities

- Conduct targeted surveys of all known sites to better determine the species' population size. Surveys should be undertaken when the species is flowering, likely from early spring to summer.
- Maintain a monitoring program to:
  - determine trends in population size and distribution;
  - determine threats and their impacts; and,
  - monitor the effectiveness of management actions and the need to adapt them if necessary.
- Survey suitable habitat for new subpopulations.

### Information and research priorities

- Conduct research into the taxonomy of the *Rhodanthe* genus, including by formally describing *Rhodanthe* sp. Point Lookout and potentially conducting a molecular and morphological revision of the genus to clarify its taxonomic distinctiveness.
- Increase knowledge surrounding the biology and ecology of the species. This includes improving understanding of pollination biology (and ecology of pollinators), seed recruitment and longevity, plant longevity and time to maturity, genetic structure, and minimum viable population size.
- Investigate and determine which subpopulations are currently being impacted by feral goats, and if there are any herds nearby known sites.
- Investigate how changing temperatures are likely to impact flowering and seed-set and the interaction between flowering and pollination.
- Investigate the impact of drought on *Rhodanthe* flower production, seed yield and recruitment, and seedling growth.
- Investigate the susceptibility of known sites to future landslides and collapse due to extreme weather.
- Understand the potential influence of climate change on the long-term persistence of the species.
- Ascertain the cultural significance of *Rhodanthe* sp. Point Lookout to First Nations Peoples.
- Determine habitat critical to the survival of *Rhodanthe* sp. Point Lookout.

### Recovery plan decision

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.

## Links to relevant implementation documents

Threat abatement plan for competition and land degradation by unmanaged goats (2008)

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

# Attachment A: Listing Assessment for *Rhodanthe* sp. Point Lookout

## Reason for assessment

This assessment follows prioritisation of a nomination from the TSSC.

## 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 3 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria.

### Table 3 Key assessment parameters

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|---|---|---|---|---|
| **Number of mature individuals** | unknown | 28 | Unknown | The number of mature individuals is unknown, though one subpopulation is known to have at least 28 individuals (DPIE 2021). |
| **Trend** | unknown | | | The number of mature individuals is likely declining due to a combination of threats including bushfires, escarpment collapse, drought and feral goats (Table 1). |
| **Generation time (years)** | ~7 | Unknown | Unknown | The generation length of *Rhodanthe* sp. Point Lookout is unclear, as the primary juvenile period and life expectancy of the species is unknown. However, generation length of another co-familial perennial daisy *Leucochrysum albicans* var *tricolor* (hoary sunray) is inferred to be around seven years (DAWE 2020). This taxon is considered to be similar to chamomile sunray (Greening Australia n.d). |

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|---|---|---|---|---|
| **Extent of occurrence** | 284 km$^2$ | 284 km$^2$ | <500 km$^2$ | The current estimated EOO is 284 km$^2$. This estimate of EOO was attained by mapping point records from 2004–2021, obtained from state governments, museums, and CSIRO. The EOO was then calculated using a minimum convex hull (IUCN 2019).<br>The species may be more widespread than current records suggest, however, it is unlikely to occur outside of the New England region and the maximum EOO is therefore likely to be less than 500 km$^2$. |
| **Trend** | Unknown | | | Due to the inaccessibility of the species' habitat, it is likely that other unknown subpopulations are extant. If these are found, the EOO may increase. |
| **Area of Occupancy** | 16 km$^2$ | 16 km$^2$ | <100 km$^2$ | The current estimated AOO is 16 km$^2$. This estimate is based on the mapping of point records from 2004– 2021, obtained from state governments, museums and CSIRO. The AOO itself was calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines (IUCN 2019).<br>The species may be more widespread than current records suggest, however, due to its specialised habitat the maximum AOO is therefore likely to be less than 100 km$^2$. |
| **Trend** | increasing | | | Due to the inaccessibility of the species' habitat, it is likely that other unknown subpopulations are extant. If these are found, the AOO would increase. |
| **Number of subpopulations** | 4 | 4 | >4 | The known subpopulations are Apsley Falls, Steep Drop Falls, Point Lookout and Darkie Point. There are likely more undiscovered subpopulations due to the species' inaccessible habitat. |
| **Trend** | increasing | | | Due to the inaccessibility of the species' habitat, it is likely that other unknown subpopulations exist. |
| **Basis of assessment of subpopulation number** | All four known subpopulations are separated by at least 5 km and found at isolated gorge and cliffside sites, suggesting they are distinct subpopulations. Apsley Falls has two separate sites that were surveyed by DPIE (2021), though this was considered a single subpopulation. | | | |

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|---|---|---|---|---|
| **No. locations** | 2 | 2 | 4 | There are two locations, based on the plausibility of two feral goat herds impacting all known subpopulations. Feral goats may have home ranges of up to c. 400 to 600 km$^2$ (DAF 2020; Agriculture Victoria 2021), though in higher rainfall areas with ample food and water, home ranges may be as little as 1 – 13.5 km$^2$ (DPI 2021). The home ranges of herds in New England are unclear, but given the high rainfall of the area, it is unlikely that home ranges are very large.<br>Feral goats have been observed at Apsley Falls (DPIE 2021), and, as the distance between this site and Steep Drop Falls is c. 20km, it is possible that both these subpopulations could be impacted by a single feral goat herd. Both subpopulations are therefore considered a single location.<br>Darkie Point and Point Lookout are c. 85 km from Apsley Falls. These subpopulations are likely to be impacted by separate herds of feral goats, as most of the land between these sites is OWNRP, where feral goat numbers are controlled (DPIE 2005), and it is unlikely feral goat herds in the area would have such large home ranges considering the high rainfall and availability of food. It is therefore more likely that Point Lookout and Darkie Point (c. 5km apart) will be impacted by separate feral goat herds living on the edge of New England NP. Though it is unclear if these sites are currently impacted by feral goats, it is plausible that they are present or will spread to the sites within a 10-year period, given that feral goats are found throughout the Northern Tablelands (OEH 2012).<br>Therefore, the most plausible number of locations is two, based on separate feral goat herds impacting Apsley Falls/Steep Drop Falls, and the Point Lookout/Darkie Point subpopulations.<br>The maximum number of subpopulations is four, assuming that all sites may be impacted by four different site level events (e.g., escarpment collapse). |

| Metric | Estimate used in the assessment | Minimum plausible value | Maximum plausible value | Justification |
|---|---|---|---|---|
| **Trend** | increasing | | | Due to the inaccessibility of the species' habitat, it is likely that other unknown subpopulations exist at other locations. |
| **Basis of assessment of location number** | Feral goats are known to occur at Apsley Falls (DPIE 2021), and as the distance between this site and Steep Drop Falls is c. 20km, it is possible that both these subpopulations could be impacted by a single feral goat herd. It is also plausible that Point Lookout and Darkie Point (c. 5 km apart) will be impacted by a separate feral goat herd, resulting in two locations. | | | |
| **Severe Fragmentation** | Insufficient evidence. As data on subpopulation sizes are not available for all subpopulations, it is unclear if the species is severely fragmented. All known subpopulations are located in medium to large sized national parks. | | | |
| **Fluctuations** | Not subject to 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% |

**A1** Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

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

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

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

Based on any of the following

(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 length*

The generation length of this species is not well understood. It is estimated at approximately seven years based on estimates for an ecologically similar taxon (Table 3). Therefore, three generations give a period of 21 years for this criterion.

*Population reduction*

*Rhodanthe* sp. Point Lookout is threatened by climate change, which may shorten the species' flowering period, increase the severity and frequency of bushfires and stimulate landslides in the rocky cliffside areas due to increased heavy rainfall where the species is found (Table 1). However, long-term monitoring of this species has not been undertaken, and there are no data on the extent of population reduction due to these factors. The 2019–20 fires impacted Steep Drop Falls at high severity, though post-fire surveys could not capture the impact of these fires due to poor conditions, and the number of mature individuals persisting at this site is unknown, as is the number of seedlings (DPIE 2021). Some population decline may have occurred due to drought conditions prior to the 2019-20 fires (Gallagher 2020), though there are no data on the extent of these declines. Similarly, though escarpment collapse has been observed at one site (DPIE 2021), there are no data on how many individuals were likely killed by this event.

The species may also be threatened by browsing and trampling by feral goats (Table 1). However, feral goats are currently only known to be present at one site, and there is currently no evidence of browsing impacts (DPIE 2021).

There is insufficient evidence to suggest the population has declined at a rate of over 30 percent in a three-generation period. Though known threats will likely continue to impact the species over the next 21 years, there are insufficient data from past declines to be able to project the level of population reduction that may occur.

*Conclusion*

The data presented above appear to demonstrate that there is insufficient evidence to list the species under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

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

| | | Critically Endangered Very restricted | Endangered Restricted | Vulnerable Limited |
|---|---|---|---|---|
| **B1.** | Extent of occurrence (EOO) | **< 100 km²** | **< 5,000 km²** | **< 20,000 km²** |
| **B2.** | Area of occupancy (AOO) | **< 10 km²** | **< 500 km²** | **< 2,000 km²** |
| **AND at least 2 of the following 3 conditions:** | | | | |
| (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

### Eligible under Criterion 2 B1ab(iii)+2ab(iii) for listing as Endangered

*EOO and AOO*

*Rhodanthe* sp. Point Lookout is known only from four subpopulations. The EOO of the known sites is estimated at approximately 284 km² and the AOO of known sites is 16 km². The EOO was calculated using a minimum convex hull, and the AOO was calculated using the 2x2 km grid cell method, as outlined in the IUCN Guidelines (IUCN 2019).

Given that the AOO is less than 500 km² and EOO is less than 5000 km², the species meets the threshold for listing as Endangered under and sub-criterion B1 and sub-criterion B2.

*Severely fragmented and number of locations*

To be eligible for severely fragmented, more than 50 percent of the AOO must be in subpopulations that are below minimal viable population size (IUCN 2019). Currently, it is unclear if known subpopulations are severely fragmented, as data on subpopulation sizes are not available for all subpopulations. All known subpopulations are located in medium to large sized national parks.

There are two locations, based on the plausibility of two feral goat herds impacting all known subpopulations. Feral goats are known to occur at Apsley Falls (DPIE 2021), and, as the distance between this site and Steep Drop Falls is c. 20 km, it is possible that both these subpopulations could be impacted by a single feral goat herd. Both subpopulations are therefore considered a single location. Darkie Point and Point Lookout are c. 85 km from Apsley Falls. These subpopulations are likely to be impacted by a separate herd of feral goats, as most of the land between the other two sites and these sites is OWNRP, where feral goat numbers are controlled

(DPIE 2005), and it is unlikely feral goat herds in the area would have such large home ranges considering the high rainfall and availability of food. It is therefore more likely that Point Lookout and Darkie Point (c. 5 km apart) will be impacted by a separate feral goat herd living on the edge of New England NP. This gives a total of two locations – Steep Drop Falls/Apsley Falls and Darkie Point/Point Lookout.

*Continuing decline*

There is an inferred and projected decline in *Rhodanthe* sp. Point Lookout habitat quality due to escarpment collapse and bushfire events fuelled by climate change, and herbivory by feral goats.

Escarpment collapse at Apsley Falls caused by an extreme weather event has likely decreased *Rhodanthe* sp. Point Lookout habitat quality. The collapse of one section of the cliff face appears to have made this area unsuitable for *Rhodanthe* sp. Point Lookout plants, as there are no longer any crevices suitable for plant growth (DPIE 2021; Figure 1). At Steep Drop Falls, the 2019–20 bushfires likely reduced habitat quality through the loss of co-occurring plants and the facilitation of weed invasion (Milberg & Lamont 1995; DPIPWE 2021). Both high severity bushfires and extreme weather events are expected to become more frequent in the mid-north of NSW due to climate change (OEH 2014; CSIRO & Bureau of Meteorology 2015), suggesting that decline in habitat quality due to these factors will continue.

Feral goats are known to occur at Apsley Falls. Unlike many other feral species, feral goats are capable of browsing on cliffside habitat, and can have a major impact on native plants communities through soil damage and overgrazing of herbs, grasses, shrubs and trees (DEWHA 2008). This grazing can cause erosion and prevent regeneration. Though there are no documented current browsing impacts on known subpopulations, (DPIE 2021) impacts may become more pronounced in the future, particularly if management effort is reduced. Feral goats may also spread weeds to known sites (Bayne et al. 2005; DEWHA 2008), further reducing habitat quality.

*Extreme fluctuations*

The species is not known to undergo extreme fluctuations.

*Conclusion*

The data presented above appear to demonstrate that the species is eligible for listing as Endangered under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

### Criterion 3 Population size and decline

| | | Critically Endangered<br>Very low | Endangered<br>Low | Vulnerable<br>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<br>25% in 3 years or 1 generation<br>(whichever is longer)** | **High rate<br>20% in 5 years or 2 generation<br>(whichever is longer)** | **Substantial rate<br>10% in 10 years or 3 generations<br>(whichever is longer)** |
| **C2.** An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions: | | | | |
| (a) | (i) Number of mature individuals in each subpopulation | **≤ 50** | **≤ 250** | **≤ 1,000** |
| | (ii) % of mature individuals in one subpopulation = | **90 – 100%** | **95 – 100%** | **100%** |
| (b) Extreme fluctuations in the number of mature individuals | | | | |

## Criterion 3 evidence

### Insufficient data to determine eligibility

The number of mature individuals is not known**.** Therefore, there appears to be insufficient evidence to list the species under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' 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<br>Extremely low | Endangered<br>Very Low | Vulnerable<br>Low |
|---|---|---|---|
| **D.** Number of mature individuals | < 50 | < 250 | < 1,000 |
| **D2.**[1] *Only applies to the Vulnerable category*<br>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 km² 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

The number of mature individuals is not known. Therefore, there appears to be insufficient evidence to list the species under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' 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<br>Immediate future | Endangered<br>Near future | Vulnerable<br>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

The data presented above appear to demonstrate that there is insufficient evidence to list the species under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' 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.

## Adequacy of survey

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

**Cataloguing data**

This publication (and any material sourced from it) should be attributed as: Department of Agriculture, Water and the Environment 2021, *Conservation Advice for* Rhodanthe *sp. Point Lookout* Canberra. 

This publication is available at the SPRAT profile for *Rhodanthe* sp. Point Lookout

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## Version history table

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