Australian Government
Department of Climate Change, Energy, the Environment and Water

Consultation on Species Listing Eligibility and Conservation Actions

Prasophyllum uvidulum (summer leek-orchid)

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

1) the eligibility of *Prasophyllum uvidulum* (summer leek-orchid) for inclusion on the EPBC Act threatened species list in the Critically Endangered category; and

2) the necessary conservation actions for the above species.

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

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

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:
ExpertAssessmentPlans@dcceew.gov.au

Please include species scientific name in Subject field.

or by mail to:

The Director
Threatened Species and Communities Governance Section
Department of Climate Change, Energy, the Environment and Water
John Gorton Building, King Edward Terrace
GPO Box 3090
Canberra ACT 2601

Responses are required to be submitted by Tuesday 18 April 2023.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the Department's website at: https://www.dcceew.gov.au/environment/biodiversity/threatened

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.dcceew.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.dcceew.gov.au/environment/biodiversity/threatened/nominations

The devastating bushfires that burnt more than 10.3 million hectares across southern and eastern Australia in 2019-20 severely impacted native wildlife and habitat. This created an urgent need for hundreds of species and ecological communities (ECs) to be assessed against EPBC Act criteria for threatened listing status, so that the recovery and future resilience of fire-affected species and ECs could be supported by statutory protection commensurate with their post-fire status, and to ensure EPBC Act lists are as current and accurate as possible, helping improve environmental resilience and preparedness for future fire events. As part of the Australian Government's bushfire response the Department engaged scientific experts to deliver a number of Species Expert Assessment Plans (SEAPs) for groups of species and ECs that were affected by the 2019–20 fires, or could be affected by similar fire events in the future, to enable hundreds of species and ECs to be assessed against EPBC Act criteria for threatened listing status and improve the currency of EPBC Act lists in a timely manner. Information about the SEAPs project is available at: https://www.dcceew.gov.au/environment/biodiversity/threatened/seap
This assessment follows evaluation of the conservation status of the species through the SEAPs project.

To promote the recovery of listed threatened species and ecological communities, Conservation Advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the Department's website at: https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans

Privacy notice

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

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

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the 'Common Assessment Method' (CAM). As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.

The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: https://www.dcceew.gov.au/about/commitment/privacy

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the Department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Consultation questions for *Prasophyllum uvidulum* (summer leek-orchid)

PART 1 – INFORMATION TO ASSIST LISTING ASSESSMENT

1. Do you have any additional information on the **ecology or biology** of the species?

2. Can you provide any additional information or estimates on **longevity, average life span or generation length** for the species?

3. Do you have additional information to support an **estimate of the current population size** of mature adults of the species (national extent)?

4. Do you have additional information on **population trends** over 3 generations, or an historic population size for the species (national extent)?

5. Do you have additional information on **current range** (national extent) or **location of populations** for the species?

6. Can you provide additional information on any **change in range** or **location of populations**, or an **historic range** (national extent)?

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

7. Do you have further information on the historic, current or potential **threats** facing the species?

8. Do you have further information on current or potential **management actions** to support protection and recovery of the species?

9. Do you have further information on current or potential **monitoring** or **research activities** for the species?

10. Are you aware of **other knowledge** (e.g., traditional ecological knowledge) that may help better understand the threats and management actions to aid recovery of the species?

11. Are you aware of any **cultural importance or use** that the species has?

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

PART 3 – ANY OTHER INFORMATION

13. Do you have comments on **any other matters** relevant to the assessment of this species.

Conservation Advice for *Prasophyllum uvidulum* (summer leek-orchid)

This document combines the approved Conservation Advice and listing assessment for the species. It provides a foundation for conservation actions and further planning.

Prasophyllum uvidulum © Copyright, Dean Rouse

Conservation status

Prasophyllum uvidulum (summer leek-orchid) is proposed to be listed in the Critically Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act).

Prasophyllum uvidulum was assessed by the Threatened Species Scientific Committee to be eligible for listing as Critically 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,v)+2ab(iii,v): Critically Endangered
- Criterion 3: C2a(ii): Endangered
- Criterion 4: D: Vulnerable
- Criterion 5: Insufficient data

The main factors that make the species eligible for listing in the Critically Endangered category are that it has a very restricted distribution with an Area of Occupancy (AOO) and Extent of Occurrence (EOO) of just 4 km^2; the species occurs at a single location and is experiencing continuing decline due to threats including feral herbivores, weed invasion, fire regimes that cause declines in biodiversity, localised habitat disturbance and climate change and drought impacts.

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

In this assessment, the word population is used to refer to the concept of 'subpopulation' in IUCN (2022), in keeping with the terminology used in the EPBC Act and state/territory environmental legislation and general biological usage.

Taxonomy

Conventionally accepted as *Prasophyllum uvidulum* D.L.Jones & D.T.Rouse. Family: Orchidaceae.

The species is known by two common names: summer leek-orchid and Shelly leek-orchid. Summer leek-orchid is used throughout the remainder of this document.

Prasophyllum sp. aff. *frenchii* B is considered a synonym (Jeanes 2015). The species has also been known as *Prasophyllum* species 'Shelley' (Duncan & Coates 2010).

Description

Simple description

The summer leek-orchid belongs to a group of orchids commonly known as leek-orchids because the erect hollow leaf has some resemblance to that of a leek. *Prasophyllum* species are herbaceous perennial terrestrials with small fleshy tubers. It has small fragrant greenish to reddish flowers.

Formal taxonomic description

The summer leek-orchid grows as scattered individuals approximately 20–35 cm tall. It has a single hollow leaf, pale to dark green, with leaf-blade 20–30 cm long and 2–3 mm diameter at the base, often withered at flowering. The flowering stem emerges through a slit in the leaf and has up to 25 fragrant, pale green flowers with reddish markings in an uncrowded open spike 8–12 cm long.

The ovary is egg-shaped with the narrow end attached to the stem, 4–5 mm long and green with reddish ridges. Sepals are 6–9 mm long with the upper sepal roughly horizontal and oval to lance-shaped, with side sepals straight to lance-shaped and curved upward. Petals are 6–7 mm long, straight to lance-shaped with a pointed tip, and curved inward. The labellum (modified lower petal) is ovate, 6–7 mm long, white, pinkish or mauve, bent back at right angles and constricted just above the middle. The labellum is not pouched at the base. A distinctive elliptical callus, or raised plate, is dark green and shiny with a central channel, extending about halfway to the labellum apex, with irregular or toothed margins. The column, or central fleshy structure, is approximately 3 mm long with pink appendages that are linear to oblong, around 2 mm long.

Description from Jones & Rouse (2009), Duncan & Coates (2010) and Jeanes (2015).

Distribution

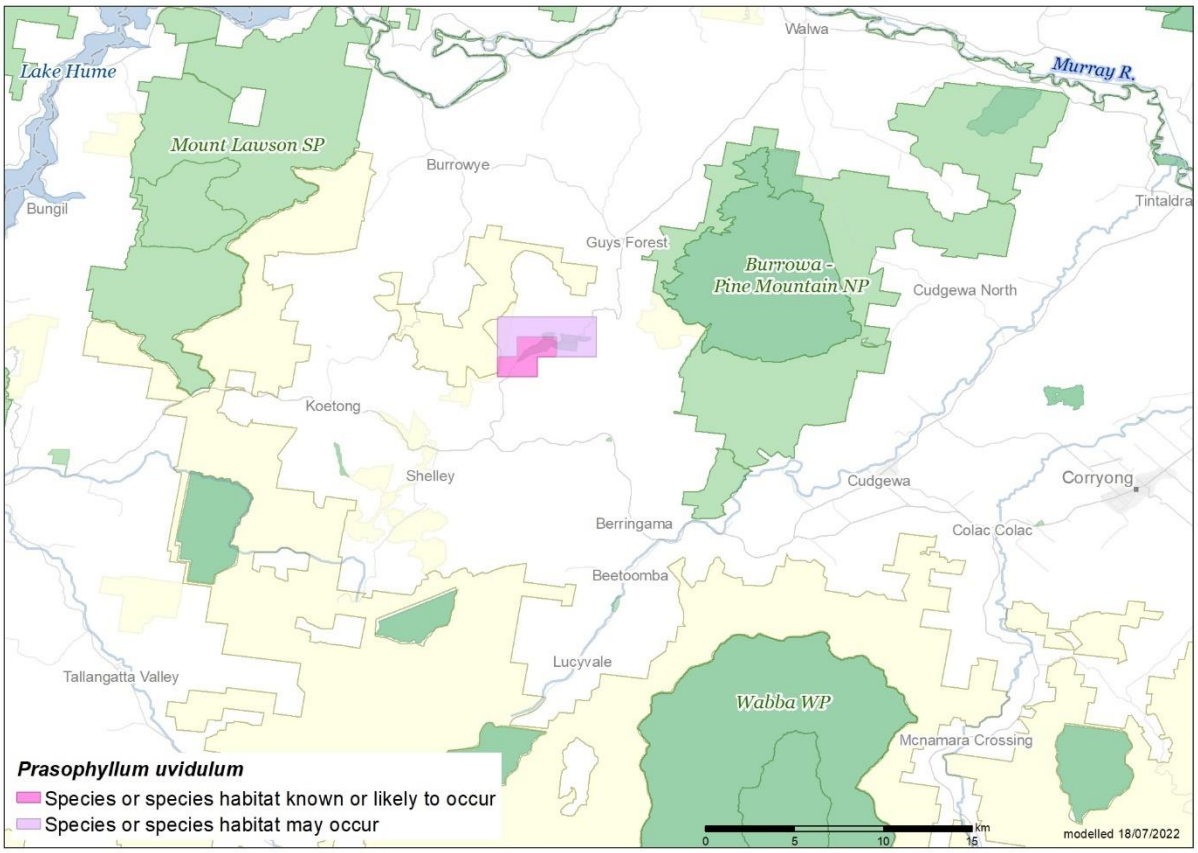
The summer leek-orchid is endemic to north-eastern Victoria, at a single known site, near Shelley in the Upper Murray region. It grows within a small, protected flora reserve, Pheasant Creek Flora Reserve, under the management of Parks Victoria (PV) and the Victorian Department of Environment, Land, Water and Planning (DELWP). The reserve is bounded by *Pinus radiata* (radiata pine) plantations managed by Hancock Victorian Plantation (HVP) on all sides.

The single known population was burned in the 2019–20 bushfires. Prior to the bushfires, approximately 15 plants were recorded in 2019 and 18 plants in 2018, from DELWP/PV surveys conducted under dry conditions (DELWP & PV 2019). The population has been regularly surveyed over at least 15 years, with approximately 10–25 plants recorded above ground in most years. The maximum number of plants recorded above-ground, prior to the 2019–20 fire season was 57 in 2015 (G Johnson 2022. pers comm 13 October). All plants surveyed are mature individuals, as only flowering plants were able to be detected, given this is a geophytic species that remains dormant underground for much of the life cycle. Non-flowering plants are difficult to detect amongst other vegetation, particularly when biomass is high (G Johnson 2022. pers comm 13 October). The population was previously known from three distinct groups within a small area (approximately 1 km extent), although only two of the three groups of plants were able to be located in all surveys since 2011, with the site of the third group heavily invaded by weeds.

Surveys in 2020 after the bushfires recorded an estimated 300 plants in two closely located groups (G Johnson 2022. pers comm 13 October). Post-fire conditions (including substantially reduced vegetation biomass and high rainfall) at the time of survey were close to optimal for flowering, and therefore detection, of this species (MW Freestone 2022. pers comm 21 March). It is likely that most plants in the population would have flowered under these conditions, where only approximately 10% would flower in a given season under average conditions. The large increase in the number of flowering plants in 2020 is not considered to reflect an increase in the population size of the summer leek-orchid, but instead indicate that dormant or non-flowering plants were stimulated to flower by the 2019–20 bushfires and subsequent good rainfall, as previously documented in other orchid species (Duncan 2012; Lamont & Downes 2011). In the following year, 2021, just 30 plants were detected (G Johnson 2022. pers comm 13 October).

The species has not been found elsewhere despite extensive searches for both plants and similar habitat. There is little to no similar habitat supporting remnant vegetation in close proximity to the known reserve site, which is unique in the Burrowa-Pine Mountain area (G Johnson 2022. pers comm 13 October). Larger areas of potential habitat in the surrounding area have been converted to pine plantations.

Map 1 Modelled distribution of summer leek-orchid



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.

The summer leek-orchid occurs on the lands of the Jaitmatang people (AIATSIS 2021). The cultural significance of the summer leek-orchid is currently unknown. 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

Overall, the biology and ecology of the summer leek-orchid requires further investigation but current knowledge is summarised below.

Habitat

The summer leek-orchid lives in winter-wet seepage areas of riparian grassland vegetation, at the margins of a seasonal swamp at approximately 700–750 m altitude. Native grassy woodland occurs around the periphery of this seasonal wetland, within a taller montane eucalypt forest (Duncan & Coates 2010; Jones & Rouse, 2009). Plants grow both in areas that are seasonally inundated and in adjacent, slightly higher, grassier areas that are probably not regularly inundated for long periods of time.

Associated native species include *Eucalyptus camphora* (mountain swamp gum), *Acacia melanoxylon* (blackwood), *Epacris gunnii* (ace-of-spades heath), *Epacris paludosa* (swamp heath) *Leptospermum continentale* (prickly tea tree) (VBA 2022). Common ground layer species include *Baloskion australe* (mountain cord-rush), *Carex appressa* (tall sedge), *Carex gaudichaudiana* (fen sedge), *Machaerina rubiginosa* (soft twig-sedge) and *Restio australis* (mountain cord-rush) in regularly inundated areas, and *Anthosachne scabra* (common wheat-grass), *Arthropodium milleflorum* (pale vanilla-lily), *Craspedia variabilis* (variable billy-buttons), *Poa costiniana* (bog snow-grass) and *Rytidosperma penicillatum* (weeping wallaby-grass) in slightly drier areas (VBA 2022).

Soil at the site is a heavy grey-brown clay loam in the slightly drier parts of the population (Jones & Rouse, 2009) and black and peaty in the wetter parts of the population (Jones 2000).

Reproduction and fire ecology

Prasophyllum species generally take two to five years to reach maturity (primary juvenile period) and can likely live for several decades (TSSC 2006), although a species-specific estimate is unknown. The age of senescence or decline is estimated to be 20–30 years for this species (MW Freestone 2022. pers comm 3 February).

Summer leek-orchid reproduces via seed, and each plant has a single underground tuber, replaced annually, that allows them to persist underground for long periods. Orchid seeds are generally miniscule in size and therefore wind-dispersed and are not known to form a persistent soil seedbank. While summer leek-orchids possess tubers and might therefore be expected to persist in a dormant state during unfavourable conditions, the longer the period without flowering and fresh seed production, the less likely the long-term persistence of a species in an area (Bates 1994).

The summer leek-orchid flowers in December (MW Freestone 2022. pers comm 21 March). Although flowering occurs in the absence of fire, flowering is likely to be stimulated in the year following summer fires, based on the increase in flowering plants following the 2019–20 fire season. Noting that, fire is considered to occur in this community at low frequency, given the riparian wetland habitat of the species.

Little else is known about the optimal or adverse fire regimes for this species. Periodic fire outside of the growing season is probably beneficial to summer leek-orchid populations by reducing the amount of competing vegetative biomass of co-occurring species and promoting growth and flowering (Backhouse & Jeanes 1995). Within the non-dormant growing season, fire can be detrimental to the species' persistence, particularly where fires occur soon after leaf emergence. Tubers at this time may have insufficient resources to sustain a second flush of leaf production, resulting in tuber mortality and consequently plant senescence (Jasinge et al. 2018).

Pollinators of summer leek-orchids are likely to be unspecialised bees, wasps and flies, as the species likely produces nectar, like other leek-orchid species (Backhouse & Jeanes 1995), although specific information on pollinators of summer leek-orchid is lacking. A few *Prasophyllum* species appear to be primarily self-pollinating (Backhouse & Jeanes 1995).

Prasophyllum species, like many orchids, require a fungal symbiont for germination and nutrient uptake (Bates 1994). For the summer leek-orchid, mycorrhizal fungi found in the roots of adult plants comprise at least two species of *Ceratobasidium*, at least one of which has been confirmed to support germination (Freestone 2021).

Habitat critical to the survival

The summer leek-orchid is known from winter-wet seepage areas of riparian grassland vegetation, at the margins of a seasonal swamp at approximately 700–750 m altitude. Native grassy woodland occurs around the periphery of this seasonal wetland, within a taller montane eucalypt forest (Duncan & Coates 2010; Jones & Rouse 2009). Plants grow both in areas that are seasonally inundated and in adjacent slightly higher grassier areas that are probably not regularly inundated for long periods of time. Soil at the site is a heavy grey-brown clay loam in the slightly drier parts of the population (Jones & Rouse 2009) and black and peaty in the wetter parts of the population (Jones 2000).

All habitat for the species in the sole known population should be considered as habitat critical to the survival of the species. Areas identified as suitable for translocations should also be considered as habitat critical to the 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

The summer leek-orchid is known from a single population comprising two to three sites within a linear extent of approximately one kilometre. As the only known population in existence, this population within a small Flora Reserve represents an important population for this species.

All populations of the summer leek-orchid are important for the long-term recovery and survival of this species.

Threats

Several threats have been identified as impacting or potentially impacting the summer-leek orchid population, particularly grazing by feral animals and weed encroachment on an ongoing basis, as well as fire regimes that cause declines in biodiversity, namely out-of-season fire for this species, with the potential for damaging peat fires. Climate change leading to an increased likelihood of drought and changes to hydrological regimes is also considered a threat. Hydrological changes can also be caused by proximity to pine plantations, potentially as an interacting threat with climate change. Vehicle damage and trampling are also threats. These threats operate across the entire population of this species given its very restricted range, with a high risk of extinction.

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

Table 1 Threats

Threat	Status [a]	Evidence
Invasive species		
Feral grazing	• Timing: historical/current/future • Confidence: observed • Likelihood: possible • Consequence: catastrophic • Trend: unknown • Extent: across the entire range	The small reserve where the summer leek-orchid is located is known to be impacted by grazing by feral herbivores, particularly sambar deer (*Rusa unicolor*) and fallow deer (*Dama dama*), with wild pigs (*Sus scrofa*) historically. Feral herbivores have been identified as a major threat to summer leek-orchids. A deer exclusion fence is currently in place around the site since 2021 (DELWP 2021) but requires continuous monitoring and maintenance to be effective. Deer grazing and trampling, especially during flowering and fruiting, would impact recruitment. Pigs have been observed eating tubers of other *Prasophyllum* species (*P. niphopedium* in Alpine National Park; MW Freestone 2022. pers comm 3 February) and could quickly decimate a small population if present.
Hydrological change caused by pine plantations	• Timing: historical/current/future • Confidence: inferred • Likelihood: possible • Consequence: major • Trend: unknown • Extent: across the entire range	The reserve in which summer leek-orchid occurs is surrounded by *Pinus radiata* plantations. Pine plantations are known to cause declines in the water table (Yesertener 2005), and it is plausible that this may have occurred historically at this site. As summer leek-orchid occurs in wetland-edge habitat, hydrological changes caused by declines in the water table from surrounding pine plantations are likely to negatively impact the species.

Threat	Status [a]	Evidence
Weed encroachment	• Timing: historical/current/future • Confidence: observed • Likelihood: possible • Consequence: major • Trend: unknown • Extent: across the entire range	Weed invasion, particularly from introduced grasses, is a threat for the summer leek-orchid (Duncan & Coates, 2010; G Johnson 2022. pers comm 13 October). High weed biomass is likely to limit the population through shading and/or increased root competition. Weed encroachment is considered responsible for the likely extinction of the third group of plants, sometime around 2012 (G Johnson 2022. pers comm 13 October). The site where the orchid occurs is subject to weed invasion from species present in surrounding pine plantations (Jones & Rouse 2009), particularly from blackberry (*Rubus fruticosus* spp. Agg.), trefoil (*Lotus* sp., likely *Lotus corniculatus* var. *corniculatus*) and tall-growing exotic grasses such as Yorkshire fog (*Holcus lanatus*). Sweet vernal grass (*Anthoxanthum odoratum*) is abundant at the site, although its impact on summer leek-orchid is uncertain and control options are likely to be limited due to the risk of non-target impacts on summer leek-orchid (G Johnson 2022. pers comm 13 October). *Pinus radiata* wildings, although not currently impacting the population, are a persistent threat, as the species is surrounded by pine plantations with grass understorey along with a road reserve. A weed control program is currently in place for the site but needs to remain continuous to be effective. High biomass of vegetation generally is considered a threat for *Prasophyllum uvidulum*, particularly post-fire, where vigorous regrowth from native suckers and seedlings can encroach on the open area favoured by the species. Eucalypt (tribe Eucalypteae) and blackwood (*Acacia melanoxylon*) invasion have been noted post-2019–20 bushfires (G Johnson 2022. pers comm 13 October).
Climate change		
Increased frequency of extreme temperatures, droughts and fire weather, and changes in precipitation	• Timing: current/future • Confidence: inferred • Likelihood: likely • Consequence: major • Trend: increasing • Extent: across the entire range	CSIRO (2022) predict north-east Victoria will experience decreased precipitation and increased average temperatures, with greater frequency of droughts and a harsher fire-weather climate over the course of the century. The wetland-edge habitat of summer leek-orchid is dependent on specific hydrological regimes that are likely to be affected by long-term drought and associated changes to hydrology within its narrow range. The species lives in seasonally damp to wet microhabitats, which are likely to increasingly dry out with the increasing temperatures, decreasing rainfall and increasing evaporation rates for south-eastern Australia (Abram et al. 2021). A harsher fire-weather climate is predicted for this region over the course of the century with high confidence (CSIRO 2022). Although the species' habitat has not historically been considered fire-prone, fire will become more likely and more frequent, increasing the chance of detrimental out-of-season fires, frequent fire, or potentially peat fire.

Threat	Status [a]	Evidence
Fire		
Fire regimes that cause declines in biodiversity [b]	• Timing: future • Confidence: inferred • Likelihood: unknown • Consequence: major • Trend: unknown • Extent: across the entire range	Fire regimes that cause declines in biodiversity is listed as a Key Threatening Process under the EPBC Act (DAWE 2022). The mechanisms by which fire can impact species are diverse and can be direct or indirect. ***Out of season fire*** Fire seasonality is a potential threat, inferred from other terrestrial orchid species (Jasinge et al. 2018), while fire severity is likely to be a lesser threat based on the species habitat. Summer leek-orchid may be threatened by out-of-season fires during the non-dormant phase, from April to early January. When fire occurs out of season there are a number of mechanisms that lead to recruitment failure and reduce the recovery potential of species following fire (DAWE 2022). These include: 1) seedling mortality due to desiccation as a consequence of the interaction between out of season fires and fire-hydrological interactions (Miller et al. 2019); 2) low rate of seed production due to sub-optimal flowering cues, particularly by species that rely on seasonal pollinators or specific flowering conditions (Brown et al. 2016); and 3) disruption to processes that facilitate post-fire recovery and limit dispersal (Jasinge et al. 2018; Keith et al. 2020), particularly for species with seasonal growing conditions such as orchids. If fires occur soon after leaf emergence, the tubers may store insufficient resources to sustain a second flush of leaf production, resulting in tuber mortality (Jasinge et al. 2018). Out of season fire can also affect mycorrhizal fungal communities (Jasinge et al. 2018) or pollinator communities (Brown et al. 2016). ***Peat fire*** Peat fires are also considered a lesser potential threat to the summer leek-orchid. Peat fires burn peat-rich subsoil typically in low-lying, seasonally inundated areas of waterlogged vegetation (DAWE 2022). Peat fires can be extremely destructive, consuming the substrate and killing plants, including orchids (DAWE 2022). Although there is no evidence that peat fires have affected summer leek-orchid in the past, the species may grow in susceptible habitat, described previously as 'peaty' (Jones 2000), and thus peat fires pose a potential risk to the species, although this is unconfirmed. This is considered less likely following the 2019–20 fire season, where no peat fire occurred despite conditions in this region being unusually dry.

Threat	Status [a]	Evidence
Recreational activities		
Off-road driving	• Timing: historical/current/future • Confidence: observed • Likelihood: possible • Consequence: moderate • Trend: unknown • Extent: across the entire range	Deep rutting from illegal off-road driving has been observed within 20 m of plants in recent years, and it is an ongoing threat to the species (MW Freestone 2022. pers comm 21 March). Due to the soft, waterlogged soils off-road driving can cause substantial soil disturbance. As well as direct impacts to plants, rutting from off-road driving has the potential to cause localised changes to drainage patterns that could affect the hydrology of parts of the population (MW Freestone 2022. pers comm 21 March). This threat has been mitigated to some extent by the construction of the deer fence.
Trampling	• Timing: current/future • Confidence: inferred • Likelihood: possible • Consequence: minor • Trend: unknown • Extent: across the entire range	Trampling from orchid enthusiasts is likely to cause occasional damage to flowering plants. Plants are concentrated in a small area that puts them at risk of unintentional trampling, although the reserve is relatively remote, and is probably not exposed to high levels of visitation by orchid enthusiasts (G Johnson 2022. pers comm 13 October).
Illegal collection	• Timing: current/future • Confidence: inferred • Likelihood: possible • Consequence: minor • Trend: unknown • Extent: across the entire range	Illegal collection is a threat for rare species, particularly orchids, although the reserve is relatively remote (G Johnson 2022. pers comm 13 October). There has not been evidence of collection in the past for this species (Coates et al. 2002).

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

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 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; 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 2 Risk Matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain					
Likely				Increased frequency of extreme temperatures, droughts and firedanger weather, and changes in precipitation	
Possible		Trampling Illegal collection	Off-road driving	Weed encroachment Hydrological change caused by pine plantations	Feral grazing
Unlikely					
Unknown				Fire regimes that cause declines in biodiversity	

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

To minimise the likelihood of extinction in the wild for *P. uvidulum*, the species will be sustained in habitats where threats are managed effectively.

Conservation and management priorities

Invasive species impacts (including feral grazing, trampling, predation and weed invasion)

- Continue monitoring and maintenance of the deer fence currently in place around the flora reserve, to ensure exclusion of exotic herbivores and two-way access of native herbivores e.g. black wallaby, eastern grey kangaroo and wombat that play an important role in ecosystem health via biomass reduction and fungi transfer.
- Continue to evaluate the need for a fence upgrade to ensure effective herbivore exclusion, especially of pigs.
- Continue the monitoring and weed control program currently in place by PV & DELWP to prevent encroachment of high threat weeds on the site, particularly from neighbouring pine plantations, using controls not harmful to terrestrial orchids. This will often necessitate weed control by hand.

Fire impacts

- Exclude aseasonal prescribed fire to avoid detrimental effects on summer leek-orchids at critical stages of the life cycle, i.e., during the non-dormant phase, from May to early January. While prescribed fire is not used in the surrounding pine plantations, it has been considered for use in the reserve, particularly for control of high biomass of exotic weed species such as sweet vernal grass.
- Ensure rapid response to aseasonal wildfire or peat fires: any future aseasonal wildfires that threaten to burn over recovering sites should be rapidly extinguished, whilst ensuring no new soil disturbance within the reserve. Avoid application of fire retardants in the habitat. Use biosanitary protocols in accordance with national guidelines (see "Arrive Clean, Leave Clean" Commonwealth 2015) for firefighting machinery.
- Implement experimental ecological burns where monitoring demonstrates a need for this e.g., excessive biomass or abundance of exotic species that are fire intolerant. Fires must be managed to ensure that they support rather than degrade the habitat necessary to the threatened species; that they do not promote invasion of exotic species, and that they do not increase impacts of grazing/predation.
- Fire management authorities and land management agencies should use suitable maps and be aware of field markers in place, to avoid damage to the threatened species.

Climate change impacts

- Investigate options for maintaining in situ persistence as the climate changes, for example by minimising other population pressures, enhancing resilience and promoting recruitment or supplementing existing population.

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

- Continue to collect and store seed and mycorrhizal fungi using suitable protocols.

- Cultivate additional ex situ collections of individuals of summer leek-orchid to safeguard against the unforeseen destruction of the wild population. A very small number of summer leek-orchid plants, as well as fungal symbionts, are already in cultivation in the Royal Botanic Gardens Victoria collection (MW Freestone 2022. pers comm 3 February), therefore ex-situ propagation methods and nursery cultivation requirements are now reasonably well known.
- Establish new translocated populations and bolster the existing population with cultivated plants to improve the conservation outlook of the species in areas of suitable habitat in response to multiple threats. This is a priority for implementation, as the Royal Botanic Gardens Victoria have seed and mycorrhizal fungi in storage and have established nursery cultivation with summer leek-orchids grown ex-situ (N Reiter 2022. pers comm 3 February). New populations should be established implementing national translocation protocols (Commander et al. 2018).
- Monitor all translocated individuals to maturity, seed set and recruitment to ensure they are viable and are contributing to a reduction in the extinction risk for the species.

Recreation impacts

- Ensure unauthorised vehicle access is maintained – currently the deer fence minimises access.

Stakeholder engagement/community engagement

- Continue work between DELWP, PV and neighbouring pine plantation owners Hancock Victorian Plantations (HVP) to manage threats in surrounding areas that are likely to impact the population, particularly weeds and feral herbivores.
- Identify opportunities for, and promote and support, the continued involvement of community groups and volunteers in recovery activities for the species, particularly Koetong Landcare group and the Upper Murray Landcare Network.
- Update available information about the species, including information about its appearance, habitat, threats, recovery actions and the importance of locating, monitoring and protecting populations over the long-term.
- Relevant Traditional Owners should be identified and consulted with on all planned recovery actions. Effort should be made to collaborate with Traditional Owner groups in the implementation of any actions.
- Engage cultural knowledge custodians and land rights holders in conservation actions, including the implementation of Indigenous fire management and other survey, monitoring and management actions. Enable the sharing of knowledge, while ensuring the processes and protocols to record, store, and share any knowledge are agreed and appropriately resourced. Information on the application of cultural burning and integrated Caring for Country practices to protect and enhance habitat is of critical importance.

Survey and monitoring priorities

- Continue the current DELWP/PV demographic monitoring program and implement further monitoring to determine:

- trends in population size and stability, potential habitat and habitat condition/ degradation
- levels of seed production and recruitment
- success of in situ and ex situ population enhancement measures.

- Survey and map actual and potential habitat, using ecological and bioclimatic information that may indicate habitat preference.
- Identify possible reintroduction sites and determine the suitability of surveyed habitat for conservation translocations of the species.

Information and research priorities

- Conduct research into the life history and ecology of the species, given the paucity of available information. This includes determining plant longevity, phenology and seasonal growth rates, pollinator biology and requirements, recruitment and mycorrhizal symbionts. Additional research priorities could include minimum viable population size, the role of seed predators and other disturbances on recruitment via seed, roles of competition and rainfall in recruitment, and reproductive strategies.
- Conduct research into the effect of different fire regimes, both by monitoring the population at different stages in the fire cycle, as well as by experimentation on related, but less threatened *Prasophyllum* species. This would allow inference about the effects of frequency, severity and seasonality of fire on survival and recruitment. Both seasonality (Jasinge et al. 2018) and fire frequency (Coates et al. 2006) are known to affect population persistence in other orchid species. It may be difficult to replicate conditions from the 2019-20 fire season in-situ, as this season was exceptionally dry and hot.
- Research the factors influencing the effectiveness of conservation translocations for this species.
- Research appropriate controls for sweet vernal grass, which is difficult to control due to the presence of native species amongst this weed (G Johnson 2022. pers comm 13 October). Controlled burning at appropriate times may be an option for control of this weed species.
- Understand the impact of adjoining pine plantations and their management on the hydrology of the summer leek-orchid population.
- If feasible, undertake vulnerability assessments of the species' sensitivity and adaptive capacity to changing climatic conditions which draw on genetic, physiological or ecological evidence.
- If vulnerability assessments indicate the species has a high likelihood of extinction due to climate change, undertake research to identify climate refuges that may be suitable for translocations, including both modelling and experimental approaches (e.g., trial translocations). Consideration should be given to the benefits to the species in mitigating climate change related threats, as well as the risks to the recipient site (e.g., introduction of diseases, pests and/or pathogens, and invasiveness of the species).

Links to relevant implementation documents

Arrive Clean, Leave Clean (2015)

National recovery plan for Twenty-five threatened orchid taxa of Victoria, South Australia and New South Wales 2003 – 2007

National Recovery Plan for Twenty-one Threatened Orchids in South-eastern Australia (2010)

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.

Conservation Advice and Listing Assessment references

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

Attachment A: Listing Assessment for *Prasophyllum uvidulum*

In this assessment, the word population is used to refer to the concept of 'subpopulation' in IUCN (2022), in keeping with the terminology used in the EPBC Act and state/territory environmental legislation and general biological usage.

Reason for assessment

The devastating bushfires that burnt more than 10.3 million hectares across southern and eastern Australia in 2019–20 severely impacted native wildlife and habitat. This created an urgent need for hundreds of species and ecological communities (ECs) to be assessed against EPBC Act criteria for threatened listing status, so that the recovery and future resilience of fire-affected species and ECs could be supported by statutory protection commensurate with their post-fire status, and to ensure EPBC Act lists are as current and accurate as possible, helping improve environmental resilience and preparedness for future fire events.

As part of the Australian Government's bushfire response the Department engaged scientific experts to deliver a number of Species Expert Assessment Plans (SEAPs) for groups of fire-affected and non-fire affected species and ECs, to enable hundreds of species and ECs to be assessed against EPBC Act criteria for threatened listing status and improve the currency of EPBC Act lists in a timely manner.

This assessment follows evaluation of the conservation status of *Prasophyllum uvidulum* through the SEAP project.

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. The definition of each of the parameters follows the Guidelines for Using the IUCN Red List Categories and Criteria.

Table 3 Key assessment parameters

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	300	300	>300	Surveys in 2020, after the 2019–20 bushfires, recorded approximately 300 mature flowering plants (G Johnson 2022. pers comm 13 October). The entire population was burnt in 2019–20 and received high rainfall during 2020, resulting in close-to-optimal conditions for flowering. Accordingly, it is likely that most plants in the population flowered. Recent monitoring counts recorded approximately 18 plants in 2018 and 15 plants in 2019 under dry conditions, which is considered sub-optimal for flowering and therefore not an accurate estimate of the entire population of mature individuals. The large increase in the number of flowering plants in 2020 does not reflect an increase in the population size of the summer leek-orchid, but instead that dormant or non-flowering plants were stimulated to flower by the 2019–20 bushfires and subsequent high rainfall. The true maximum plausible value is unknown, as not all individuals in the population are likely to flower or appear above ground (and be visible during surveys) at the same time, even under optimal conditions.
Trend	declining			Three groups of plants occurred within the single known site, although only two groups of plants have been recorded in annual surveys over the last 10 years, since approximately 2012. The third group contained up to several dozen plants but has been heavily invaded by weeds and no summer leek-orchid individuals have been seen since 2011 (G Johnson 2022. pers comm 13 October). The species therefore probably numbered over 300 plants previously, up to 350, but has declined to around 300 plants currently (G Johnson 2022. pers comm 13 October). This is inferred from the number considered lost with the presumed extinction of the third group.
Generation time (years)	15	7–10	30	Very little is known of the generation length of *Prasophyllum*, except that they take two to five years to reach maturity and can live for 20–30 years. Using these estimates, the average age of flowering plants (i.e., generation length) is somewhere between five and 30 years, most likely around 10–15 years or even less, depending on plant survival rates. Estimates of generation length span this range.
Extent of occurrence	4 km^2	4 km^2	>4 km^2	The species has only ever been recorded from one site with records located a few hundred metres apart at most. EOO was calculated by fitting a minimum convex polygon around all confirmed records as per IUCN guidelines (IUCN 2022). However, as EOO was calculated to be smaller than AOO, the AOO estimate was used as the EOO estimate for the purposes of this assessment (IUCN 2022). There is little to no similar habitat near the known site and the species is unlikely to occur elsewhere.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Trend	stable			The species has only ever been recorded at one site. Despite the loss of one group of plants, the population is still contained within the minimum of one 2x2 km grid cell (IUCN 2022).
Area of Occupancy	4 km^2	4 km^2	>4 km^2	The species has only ever been recorded from one site, occurring across an area of less than 4 km^2. There is little to no similar habitat near the known site and the species is highly unlikely to occur elsewhere.
Trend	stable			The species has only ever been recorded at one site. Despite the loss of one group of plants, the population is still contained within the minimum of one 2x2 km grid cell (IUCN 2022).
Number of populations	1	1	1	The species has only ever been recorded at one site, where three groups of plants were recorded within a linear extent of about 1 km, with only two groups of plants extant since 2012. There is little to no similar habitat elsewhere nearby and additional populations of the species are unlikely to exist.
Trend	stable			The species has only ever been recorded at one site.
Basis of assessment of population number	The species has only ever been recorded at one site with three groups of plants across a distance of about one kilometre. Noting that one of these groups is presumed to be extinct.			
No. locations	1	1	1	The species has only ever been recorded at one site. There is little to no similar habitat elsewhere and the species is highly unlikely to occur elsewhere. The primary threats to this species, i.e., feral herbivores, weed invasion, fire regimes that cause declines in biodiversity (in particular aseasonal fire) and drought, act across the distribution of the species.
Trend	stable			The species has only ever been recorded at one site.
Basis of assessment of location number	The species has only ever been recorded at one site. There is little to no similar habitat elsewhere and the species is unlikely to occur elsewhere. The primary threats to this species, i.e., feral herbivores, weed invasion, fire regimes that cause declines in biodiversity (in particular aseasonal fire) and drought, act across the distribution of the species.			
Fragmentation	Although the population was possibly fragmented by pine plantations historically, the remaining single population is not considered to be severely fragmented. The species only has one population which could be considered isolated, however there are around 300 known individuals in this population, so it is thought to be viable (IUCN 2022).			
Fluctuations	Not subject to extreme fluctuations in numbers of plants, although only a small proportion (e.g., approximately 10%) of plants may flower (or be above ground) and therefore be detectable in a given season. The apparent large fluctuation in numbers following the 2019–2020 fire season is thought to be caused by the close-to-optimal flowering conditions in the season following the fires, with substantially reduced vegetation biomass and high rainfall.			

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

The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this Criterion.

There is some inference of a decline in the population of summer leek-orchids, however there is insufficient data to confidently project either forwards or backwards by an appropriate period of time to make an estimate sufficient to evaluate this Criterion, particularly over three generations or 45 years, given the estimated generation length of this species of approximately 15 years.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

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

		Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1.	Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2.	Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions:				
(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 populations; (v) number of mature individuals			
(c)	Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or populations; (iv) number of mature individuals			

Criterion 2 evidence

Eligible under Criterion 2 B1ab(iii,v)+2ab(iii,v) for listing as Critically Endangered

EOO and AOO

The summer leek-orchid has an EOO and AOO of 4 km². EOO was calculated by fitting a minimum convex polygon around all confirmed records as per IUCN guidelines (IUCN 2022). However, as EOO was calculated to be smaller than AOO, the AOO estimate was used as the EOO estimate for the purposes of this assessment (IUCN 2022). AOO was calculated using a 2 x 2 km grid as per IUCN guidelines (IUCN 2022). Both EOO and AOO meet the threshold for Critically Endangered (AOO: <10 km²; EOO: <100 km²).

Number of locations or severe fragmentation

The summer leek-orchid is known from a single site dispersed over <1 km. The primary threats to this species, i.e., feral herbivores, weed invasion, fire regimes that cause declines in biodiversity (in particular out of season fire) and drought, act across the entire distribution of the species and could rapidly impact all individuals in the population. Consequently, the species is considered to exist in a single location.

The species is not considered to be severely fragmented, although it is found at only one site.

Continuing decline

A decline in the number of mature individuals (>300 to approximately 300) is inferred from the presumed extinction of one groups of plants within the single site population. This has been attributed to historical weed encroachment. Declines are likely to continue due to the ongoing threats that the species is facing and the risk of stochastic events. These threats include feral herbivores, particularly sambar deer and fallow deer and pigs; weed invasion, particularly from introduced grasses (Duncan & Coates 2010; G Johnson 2022. pers comm 13 October); out of season fires, based on inference from other terrestrial orchid species (Jasinge et al. 2018); vehicle damage and trampling; and climate change leading to an increased likelihood of drought and changes to hydrology. These threats operate across the entire population given its very restricted range.

Conclusion

The Committee considers that the species geographic distribution (EOO and AOO) is very restricted, the number of locations is very restricted and continuing decline is observed and inferred in (iii) area, extent and/or quality of habitat and inferred in (v) number of mature individuals. Therefore, the species has met the relevant elements of Criterion 2 to make it eligible for listing as Critically Endangered.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 3 Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	**< 250**	**< 2,500**	**< 10,000**
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	**Very high rate 25% in 3 years or 1 generation (whichever is longer)**	**High rate 20% in 5 years or 2 generation (whichever is longer)**	**Substantial rate 10% in 10 years or 3 generations (whichever is longer)**
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each population	**≤ 50**	**≤ 250**	**≤ 1,000**
(a) (ii) % of mature individuals in one population =	**90 – 100%**	**95 – 100%**	**100%**
(b) Extreme fluctuations in the number of mature individuals			

Criterion 3 evidence

Eligible under Criterion 3 C2a(ii) for listing as Endangered

Number of mature individuals

The estimated total number of mature individuals of this species is low (approximately 300) (Table 3), therefore meeting the threshold for Endangered (<2500 mature individuals).

C1. Rate of continuing decline

There are not enough data to estimate a rate of continuing decline into the future for *P. uvidulum*.

C2. Continuing decline and population abundance/distribution

There is an inferred continuing decline in the number of mature individuals from regular monitoring over the past 15 years (DELWP & PV 2019; G Johnson 2022. pers comm 13 October), including the presumed extinction of one group of plants (Table 3). This decline is likely to continue, due to the ongoing threats facing the species, particularly given its susceptibility to stochastic threats at the single known site. Threats include feral herbivores, particularly sambar deer, fallow deer and pigs; weed invasion, particularly from introduced grasses (Duncan & Coates 2010; G Johnson 2022. pers comm 13 October); out of season fires, based on inference from other terrestrial orchid species (Jasinge et al. 2018); vehicle damage and trampling; and climate change leading to an increased likelihood of drought and changes to hydrology. These threats operate across the entire population of this species given its very restricted range.

Additionally, 100% of mature individuals occur in one population, meeting Criteria C2a(ii).

Conclusion

Therefore, the species has met the relevant elements of Criterion 3 to make it eligible for listing as Endangered.

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] *Only applies to the Vulnerable category* 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

Eligible under Criterion 4 for listing as D Vulnerable

D. Number of mature individuals

The estimated total number of mature individuals of this species is low (approximately 300), therefore meeting the threshold for Vulnerable (<1000 mature individuals) under Criterion D.

D2. Restricted AOO or number of locations and plausible future threat

Additionally, the species has a restricted geographic distribution (AOO < 20 km² and number of locations ≤ 5). There is a plausible threat, fire regimes that cause declines in biodiversity, that could drive the species to Critically Endangered or Extinct in a very short time. Therefore, the species has also met the relevant elements of Criterion 4 to make it eligible for listing as D2 Vulnerable. However, EPBC regulations do not currently include provisions for listing species under subcriterion D2 (see [1]).

Conclusion

The species is eligible under Criterion D for listing as Vulnerable.

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. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

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.

Adequacy of survey

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

Public consultation

Notice of the proposed amendment and a consultation document is made available for public comment for a minimum of 30 business days. Any comments received relevant to the survival of the species 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 made. The purpose of this consultation document is to elicit additional information to help inform the decision.

Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Climate Change, Energy, the Environment and Water 2023, Conservation Advice for *Prasophyllum uvidulum* (summer leek-orchid), Canberra.

This publication is available at the SPRAT profile for *Prasophyllum uvidulum* (summer leek-orchid).

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