

NSW Threatened Species Scientific Committee

Conservation Assessment of *Prasophyllum caricetum* D.L.Jones (Orchidaceae)

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Prasophyllum caricetum D.L.Jones (Orchidaceae)

Distribution: Endemic to NSW

Current EPBC Act Status: Not listed

Current NSW BC Act Status: Not listed

Proposed listing on NSW BC Act: Critically Endangered

Summary of Conservation Assessment

Prasophyllum caricetum was found to be eligible for listing as Critically Endangered under IUCN Criteria B1ab(iii,v).

The main reasons for this species being eligible are that (1) it has a very highly restricted geographic distribution with an estimated extent of occurrence of 21 km², (2) the minimum plausible number of threat-defined locations when considering the most serious plausible threat of herbivory and habitat degradation by feral pigs is one (range 1–3), and (3) there is an inferred continuing decline in habitat quality and number of mature individuals attributed to anthropogenic habitat degradation and damage to, or consumption of, stems, tubers and/or habitat by pigs, deer, rabbits, and cattle.



Prasophyllum caricetum. Credit: Kiarrah J. Smith

Description and Taxonomy

Prasophyllum caricetum D.L.Jones (family Orchidaceae), commonly known as the Cathcart leek orchid (or sedge leek orchid), was most recently described in Jones (2021) as follows: “Plants 250–500 mm tall. Free part of leaf to 250 x 4–8 mm. Spike 70–120 mm long, 5–25-flowered. Ovary shortly stalked, green, shiny. Flowers moderately crowded, unscented, 14–19 x 8–15 mm, green, petals white and purplish, labellum white, callus green. Dorsal sepal 7.5–12 x 3.5–4.5 mm, decurved. Lateral sepals fused or free, 7.5–12 x 1.5–2 mm, parallel or divergent, base humped. Petals 8–13 x 1.5–3 mm, widely spreading, with purplish central stripe, distal margins crinkly. Labellum sessile, ovate-oblong, recurved back on itself near middle, 8–14 x 4–6 mm, margins finely toothed, strongly wavy/crinkled. Callus ending just beyond labellum bend, apex raised, notched, papillate”.

There are a number of white-flowering species that are similar to *Prasophyllum caricetum*, with several yet to be formally described. *Prasophyllum viriosum* (stocky leek orchid) is distinguished by “flat lateral sepals, wider labellum with smooth margins and broader callus” (Jones 2021). *Prasophyllum sandrae* (Majors Creek leek orchid) “has smaller flowers, incurved petals, smaller labellum and narrower callus” (Jones 2021).

Prasophyllum caricetum is the currently accepted name (CHAH 2022a; PlantNET 2025). Based on molecular analysis, Clements and Jones (2019) include the species in the genus *Paraprasophyllum*. However, the NSW Herbarium does not currently recognise *Paraprasophyllum* as a genus, with all taxa retained within *Prasophyllum* (PlantNET 2025). Additionally, although *Prasophyllum* sp. Majors Creek (Jones 11084) is noted as a synonym of *P. caricetum* (PlantNET 2025) and the specimen referred to in this phrase name was included in the original description of *P. caricetum* (Jones 2000), Jones (2019) has since distinguished it as the separate species *P. sandrae* (CHAH 2022b), and records from this taxon are not included in this assessment.

Distribution

There are three known subpopulations of *Prasophyllum caricetum* (detailed in Table 1). These occur in the Kybeyan-Gourock subregion of the South Eastern Highlands (IBRA region, Commonwealth DCCEEW 2024a, 2024b), north-east of Bombala in New South Wales (NSW).

Records previously assigned to *Prasophyllum caricetum* in four other localities have been excluded from this assessment, as follows. Records ~19 km north of the Nunnock Swamp subpopulation are an undescribed species that differs from *P. caricetum* in flower size and floral features (D. Jones *in litt.* March 2025). A record ~69 km further north (near Snowball) is *P. viriosum*, not *P. caricetum* (D. Jones *in litt.* March 2025). White-flowering individuals near Anembo are suspected to be another misidentification given they were flowering in late November and located ~96 km north of the Nunnock Swamp subpopulation (M. Clements *in litt.* January 2025). There is also uncertainty in the identity of a record near Tinderry (CANB 949147.1; ~15 km north-west of the Anembo record) because it had finished flowering at the time of collection.

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Table 1. Details of *Prasophyllum caricetum* subpopulations based on surveys undertaken 14–15th and 30–31st January 2025 (K.J. Smith, C. Portway, and T.L. Collins, pers. obs.).

Subpopulation	Mature individuals	Notes
Nunnock Swamp	212 (across two sites)	Land tenure: National Park. Fire history: No record of burning. Before being sold to the NSW National Parks and Wildlife Service in 1999, these grasslands were used for cattle grazing during the warmer months of the year.
Tantawangalo	155 (one site)	Land tenure: State Forest. Fire History: Burnt 1987/88 and 2019/20.
Hains Swamp	21 on roadside or just over southern fence (private property not surveyed).	Land tenure: Private property and Crown roadside. Fire history: Burnt 1987/88 and 2019/20.

Area of occupancy and extent of occurrence

Prasophyllum caricetum has an estimated area of occupancy (AOO) of 16 km², and an estimated extent of occurrence (EOO) of 21 km². As recommended by IUCN (2024), AOO is based on 2 x 2 km grid cells, while EOO is based on a minimum convex polygon enclosing mapped records for the species. The records used for these estimates were obtained during surveys undertaken in January 2025 (K.J. Smith, C. Portway, and T.L. Collins pers. obs.), supplemented by records retrieved from NSW Government (2024), Atlas of Living Australia (2024), the National Herbarium of New South Wales (RBGDT 2024), C. Steele (*in litt.* December 2024), and J. Miles (*in litt.* December 2024). Of a total of 39 database records, 28 were excluded because they were duplicates or likely to be a different species (as described above).

Abundance

Prasophyllum caricetum has an estimated total population size of 4,035 (388–9,700) mature individuals. In January 2025, 388 mature individuals were detected (Table 1). However, this survey did not cover all potential habitat, nor the entire flowering period of this species. Moreover, it is possible that other mature individuals remained dormant underground, as has been observed for *P. correctum* (gaping leek-orchid) (Coates *et al.* 2006). In addition, it is unlikely that all emergent individuals would be detected in surveyed areas due to concealment within shrubs or long grass, browsing of the leaf and inflorescence, and the small size and cryptic appearance of *P. caricetum* (especially if not flowering or when grazed).

The observations of population dynamics for *Prasophyllum correctum* (Coates *et al.* 2006) were applied to derive a preliminary population size estimate for *P. caricetum* that included the individuals that may not have been counted because they emerged without flowering or were dormant underground. Analysis of monitoring data showed that under fire intervals of >3 years ~78% of *P. correctum* individuals are expected to be dormant, ~18% will emerge with a leaf only, and ~4% will flower (Coates *et al.*

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2006). Seedlings would be present, but are very difficult to detect, and therefore contribute less than 1% (*i.e.*, a negligible proportion) to the expected population life stage distribution (Coates *et al.* 2006). Assuming tuber dormancy patterns in *P. caricetum* are similar to those observed in *P. correctum*, and given the most recent fire in any of the *P. caricetum* subpopulations occurred in 2019/20, it is assumed only 4% of individuals were counted in January 2025. This provides a theoretical maximum population estimate of 9,700 mature *P. caricetum*.

A precautionary approach to the estimation of *Prasophyllum caricetum* population size is necessary given that the actual flowering rate for this species is unknown (*i.e.*, may differ from *P. correctum*), and there is an inferred continuing decline in habitat quality and number of mature individuals (detailed under 'Threats' below). It is considered likely that a large proportion of the individuals that would normally be dormant have been killed or consumed by feral pigs. In accordance with the recommendations of IUCN (2024) for resolving uncertainty, a slightly lower than mid-value of 4,035 is considered a reasonable maximum estimate for the population size of *P. caricetum*. This value is 40% of the sum of the preliminary maximum estimate and the number of individuals detected in the most recent surveys.

Ecology

Habitat

Jones (2021) described *Prasophyllum caricetum* as “highly localised, growing among small shrubs, thick sedges and heath in seasonally wet flats and montane swamps in moist to wet, brown or black peaty loam”, and noted that it “sometimes occurs in small loose groups”.

Prasophyllum caricetum detected in January 2025 were most commonly found in grassy herbfields and sedgeland adjacent to swamps, including amongst tall *Poa* sp. tussocks. Elevation of these occurrences ranged from 825–953 m. In contrast to the *P. wilkinsoniorum* recorded nearby, *P. caricetum* could be found on both slopes and flats, and in large patches among relatively short grasses. *Prasophyllum caricetum* was found close to wet areas, as well as at further distances from wet areas than *P. wilkinsoniorum* (K.J. Smith pers. obs. January 2025).

Other associations for *Prasophyllum caricetum* include peaty loams on granite, *Empodisma minus*, *Epacris paludosa*, *Epacris gunnii*, *Eucalyptus viminalis*, *Eucalyptus pauciflora*, *Gahnia* sp., *Grevillea lanigera*, *Hakea microcarpa*, *Leptospermum* sp., and *Microtis oblonga* (D.L. Jones and G.P. Phillips in RBGDT 2024; J. Miles *in litt.* April 2025).

Flowering, pollination and dormancy

Prasophyllum caricetum flowers from late December to February (Jones 2000). Around the 14th January 2025, some individuals were flowering and others were in bud. By the 30th January 2025, most individuals were flowering, but some budding and fruiting individuals were also observed (K.J. Smith pers. obs.).

Similar to *Prasophyllum canaliculatum*, extreme dry conditions prior to and during the flowering season may cause *P. caricetum* to abort flowering (Miles 2019, Miles 2024). Some individuals may not emerge at all during the flowering season, instead remaining

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dormant underground (NSW NPWS 2022), possibly due to waterlogging, drought, or competition from dense growth of grasses and sedges (Miles 2017, Miles 2019, Miles 2024). Additionally, as is the case in *P. correctum* and *P. canaliculatum*, emergent *P. caricetum* may not always produce flowers (Coates *et al.* 2006; Miles 2024). Individuals that emerge in the vegetative (*i.e.*, leaf only) state appear grass-like, and as such, may be easily missed during surveys (Coates *et al.* 2006).

Flies, weevils (Curculionidae), other beetles (*e.g.*, Cryptocephalinae), bees and wasps are potential pollinators of *Prasophyllum caricetum* inferred from other *Prasophyllum* species (Bernhardt and Burns-Balogh 1986; Adams and Lawson 1993; Jones 1997; Kuitert 2018; Encinas-Viso *et al.* 2023; Hayashi *et al.* 2024).

Outside the flowering and growth season, all *Prasophyllum caricetum* individuals persist only as underground root tubers and are not visible above ground. Based on the observations of *P. correctum* in which 75% of dormancy events were 1–2 years' duration (Coates *et al.* 2006), it is inferred that *P. caricetum* individuals could remain dormant (*i.e.*, without seasonal emergence) for 1–5 years, and some mortality occurs among dormant tubers (Coates *et al.* 2006).

Seed dispersal and germination

Orchids produce many tiny balloon-like seeds that are dispersed by wind and water, and may also be transported by animals on their fur, feathers, or muddy feet (Arditti and Ghani 2000). Because *Prasophyllum caricetum* seeds are only released at around 50 cm high, many of them are expected to settle close to the parent plant (Murren and Ellison 1998; Arditti and Ghani 2000). However, given the large numbers produced, it is reasonable to assume that some seeds are dispersed over larger distances (Arditti and Ghani 2000).

Based on the life history of other orchid species (Coates *et al.* 2006; Shefferson *et al.* 2020), and the small population size of *Prasophyllum caricetum*, it is inferred that very few *P. caricetum* seeds become mature adults. Assuming a seed is deposited in an area of suitable vegetation, soil, and climate, like other orchids, *Prasophyllum* species also require the presence of specific types of mycorrhizal fungi for germination and growth (Grant and Koch 2003; Freestone *et al.* 2023). A symbiotic association is formed with the fungi, which serves to supply nutrients to the seedling (Rasmussen and Rasmussen 2009). There is evidence indicating that the local abundance of orchids is positively related to the local abundance of their mycorrhizal fungi (McCormick *et al.* 2018).

Lifespan and generation length

The lifespan of *Prasophyllum* species is uncertain; some deaths occur due to outside factors (*e.g.*, unsuitable environment, herbivory) but intrinsic mortality is poorly understood (Benson and McDougall 2005). *Prasophyllum caricetum* lacks the stolonoid roots that produce colonies of daughter tubers (Pridgeon and Chase 1995; Clements and Jones 2019). For *P. caricetum* it is inferred that a single dropper is produced each year to form a replacement tuber (Pridgeon and Chase 1995), which is considered the same individual.

Given the difficulties of monitoring underground individuals, the lack of a reliable method for estimating the age of individuals, and that mortality rates are likely to vary

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temporally and between subpopulations, the generation length for *Prasophyllum caricetum* is uncertain. Generation lengths estimated for other *Prasophyllum* species range between 10–50 years (Commonwealth TSSC 2014; DELWP 2021, 2022; Commonwealth of Australia 2023).

Fire Ecology

It is evident from the long absence of fire from the Nunnock subpopulation (Table 1) that *Prasophyllum caricetum* does not flower exclusively within the first five years after fire, as occurs in some other *Prasophyllum* species (Ferrer-Paris and Keith 2022). The two other subpopulations of *P. caricetum* were burnt in the large wildfire that started on the 23rd January 2020. Related species, such as *P. pallens*, *P. fuscum*, *P. montanum*, and *P. correctum* are known to respond to fire with an increase in the number of flowering individuals (Coates *et al.* 2006; G. Phillips *in litt.* February 2025). There is insufficient multi-year survey data to quantify such a response in *P. caricetum*. However, it is possible that the timing of the January 2020 fire had an adverse effect on recruitment and/or survival of *P. caricetum* individuals in the Tantawangalo and Hains Swamp subpopulations because it occurred during the flowering and fruiting window of this species.

Cultural Significance

The Traditional Custodians of the lands on which *Prasophyllum caricetum* occurs are the Bidwell, Ngarigo, and Yuin peoples (Horton 1996; Native Land Digital 2025). Several *Prasophyllum* species were commonly eaten by Aboriginal peoples (Lawler 1984 in Presland 2004). The traditional Aboriginal plant use guide for the ACT region, which records traditional plant knowledge of Ngunnawal people, has the following entry for the related *Prasophyllum tadgellianum* (small alpine leek-orchid): “Like all orchids this species has an edible tuber which is best eaten roasted” (ACT Government and Ngunnawal Community 2014).

This assessment is not intended to be comprehensive of the traditional ecological knowledge that exists for *Prasophyllum caricetum*, or to speak for Aboriginal people. Aboriginal people have a long history of biocultural knowledge, which comes from observing and being on Country, and evolves as it is tested, validated, and passed through generations (Woodward *et al.* 2020). Aboriginal peoples have cared for Country for tens of thousands of years (Bowler *et al.* 2003; Clarkson *et al.* 2017). There is traditional ecological knowledge for all plants, animals and fungi connected within the kinship system (Woodward *et al.* 2020). Traditional ecological knowledge referenced in this assessment belongs to the relevant knowledge custodian and has been referenced in line with the principals of the NSW *Indigenous Cultural and Intellectual Property* (ICIP) protocol (Janke and Company 2023).

Threats

The major threats to the persistence of *Prasophyllum caricetum* are herbivory and habitat degradation by feral animals and domestic cattle, and anthropogenic habitat degradation. The resilience of *P. caricetum* to these threats may be reduced by competition with exotic plants and human-induced changes to rainfall and fire regimes.

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The adverse effects of threatening processes may be exacerbated by natural processes such as grazing by macropods, wombats, and invertebrates.

Herbivory and habitat degradation by feral animals and domestic cattle

There is an inferred continuing decline in habitat quality for *Prasophyllum caricetum* due to feral pig rooting observed in the Nunnock and Tantawangalo subpopulations. Areas affected by pig rooting were present in *P. caricetum* habitat in January 2025 but appeared to be less widespread (especially on slopes and patches farther from wet areas) than was observed in *P. wilkinsoniorum* habitat (K.J. Smith pers. obs.).

There is also an inferred continuing decline in the number of mature individuals of *Prasophyllum caricetum* attributed to trampling and the consumption of stems and tubers associated with feral animal activities and domestic cattle. Grazing and trampling of potential habitat by domestic cattle was evident on the private property on the north side of the road in the Hains Swamp locality, where adverse effects from feral pigs are also inferred. Preferential feeding by feral pigs in areas of the related *P. wilkinsoniorum* appears to have occurred in the Nunnock locality in January 2025 (Smith 2025). Damage to flowering stems by grazing or trampling adversely affects an individual's ability to produce seed in a given year (McPherson 2004). Consecutive years of limited seed production, together with mortality caused by desiccation or consumption when tubers are unearthed by pigs, places subpopulations at increased risk of extinction (McPherson 2004).

Adverse effects on *Prasophyllum caricetum* from grazing, trampling, and/or digging by deer and rabbits are suspected. Evidence of debarking by deer was observed in the Nunnock locality and a rabbit was seen (K.J. Smith pers. obs. January 2025). Rabbits have been observed digging up *Caladenia saggicola* (sagg spider orchid) tubers (Threatened Species Section 2017). The adverse effects of feral animals may be greatest during dry periods when the moisture of the swamp habitat may attract a greater number and/or frequency of these animals (McPherson 2004).

'Predation, habitat degradation, competition and disease transmission by feral pigs, *Sus scrofa* Linnaeus 1758', 'Herbivory and environmental degradation caused by feral deer', and 'Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)' are listed as Key Threatening Processes under the NSW *Biodiversity Conservation Act 2016*.

'Predation, habitat degradation, competition and disease transmission by feral pigs', 'Competition and land degradation by rabbits', and 'Novel biota and their impact on biodiversity' are listed as Key Threatening Processes under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Anthropogenic habitat degradation

There is an inferred continuing decline in habitat and the number of mature *Prasophyllum caricetum* based on the direct anthropogenic threats present in the Hains Swamp subpopulation. A main road was constructed through the swamp, and excavated soil is present as mounds along the roadsides. This contrasts with the historical description of the Hains Swamp locality: Around 1999–2000 it was "in really good condition, quite wet and with a dense cover. There was also good grassy verge on both sides of the road that supported several species of orchid, and other

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monocots” (D.L. Jones in Miles 2020). At that time, the subpopulation was described as “quite large”, with “probably at least 80 plants mainly on the north side of the road” (D.L. Jones in Miles 2020).

In February 2019, *Prasophyllum caricetum* in the Hains Swamp locality was described as locally common with 20–30 seen along a 50 m stretch of road reserve, and many others uncounted in the adjoining paddock, totalling an estimated 200–300 individuals (G.P. Phillips in RBGDT 2024; G.P. Phillips *in litt.* February 2025). Subsequently, in January 2020 the site was burnt and part of the roadside and adjoining area was bulldozed to serve as a firebreak (G.P. Phillips in RBGDT 2024; G.P. Phillips *in litt.* February 2025). In February 2021, *P. caricetum* in this area were described as scattered and mostly only persisting within intact *Poa* sp. tussocks (G.P. Phillips in RBGDT 2024). There were ~50 individuals, with many that were previously observed not seen after the fire and clearing, resulting in an estimated >75% reduction in the subpopulation (G.P. Phillips in RBGDT 2024; G.P. Phillips *in litt.* February 2025).

In January 2025, only 21 *Prasophyllum caricetum* were detected in the Hains Swamp locality. All of these were >360 m east of the site surveyed in 2019 and 2020 (*i.e.*, none were found around the previously searched sites). Only two individuals were found on the northern side of the road, which contrasts with the distribution of individuals described in 1999–2000 (see above). In January 2025, the northern adjoining paddock was heavily modified by cattle and beyond the roadside occurrences, *P. caricetum* were only detected in the southern adjoining paddock (albeit search limited to the fence lines, K.J. Smith pers. obs.).

‘Clearing of native vegetation’ is listed as a Key Threatening Process under the NSW *Biodiversity Conservation Act 2016*. ‘Land clearance’ is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Competition with exotic plants

Exotic plants may degrade *Prasophyllum caricetum* habitat by competing for space and resources. In January 2025, *Holcus lanatus* (Yorkshire fog grass) was present in varying densities throughout the species’ distribution. The Hains Swamp locality is most at risk of weed incursion due to the main road that runs through it. Other exotic plants recorded at Hains Swamp include *Cirsium vulgare*, *Eragrostis curvula*, *Rubus fruticosus* spp. agg., and *Verbascum thapsus* (G.P. Phillips in RBGDT 2024; K.J. Smith pers. obs. January 2025).

‘Invasion of native plant communities by exotic perennial grasses’ and ‘Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants’ are listed as Key Threatening Processes under the NSW *Biodiversity Conservation Act 2016*.

‘Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants’ is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

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Human-induced changes to rainfall and fire regime

Modelling of human-induced climate change predicts, with high confidence, that by 2090 there will be less spring rainfall (up to 45% reduction, though 5% increase also possible), less winter rainfall (up to a 30% reduction), and a harsher fire-weather climate in the region occupied by *Prasophyllum caricetum* (Grose *et al.* 2015). Adverse effects on *P. caricetum* from these changes are uncertain. However, it is suspected that the combination of (1) increased frequency of dry years, in which flowering may be limited; (2) loss of leaves, flowers and/or tuber reserves to fire because they emerge during peak bushfire season; and (3) wildfires occurring (or burning with greater intensity) in areas of habitat not previously affected, would result in a greater magnitude and/or frequency of reduced reproductive output. In turn, a lower reproductive output would reduce the species' resilience to the other threats implicated in its decline (*i.e.*, compounding their adverse effects).

'Anthropogenic climate change' and 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' are listed as Key Threatening Processes under the NSW *Biodiversity Conservation Act 2016*.

'Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases' and 'Fire regimes that cause declines in biodiversity' are listed as Key Threatening Processes under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threat-defined Locations

Prasophyllum caricetum is considered to occupy 1–3 threat-defined locations based on the most serious plausible threat of herbivory and habitat degradation by feral pigs. Given that the core range of feral pigs can be many square kilometres (Wilson *et al.* 2023), simultaneous adverse effects on all sites containing *P. caricetum* are plausible. Moreover, the adverse effects of feral pigs may operate cumulatively across all three subpopulations within a single generation. However, up to three locations may be present (*i.e.*, equal to the number of subpopulations) if the adverse effects of feral pigs are not operating within the same time frame across all sites.

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Assessment against IUCN Red List criteria

For this assessment it is considered that the survey of *Prasophyllum caricetum* has been adequate and there is sufficient scientific evidence to support the listing outcome.

Criterion A Population size reduction

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased. A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. A3 Population reduction projected, inferred 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 (AOO), extent of occurrence (EOO) and/or habitat quality (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.	

Outcome

Prasophyllum caricetum is considered data deficient under Criterion A.

Population reductions

Although there has been an estimated >75% reduction in the Hains Swamp subpopulation (detailed in the 'Threats' section) in the last six years, this subpopulation may have only represented ~45% of the species' total population (based on a pre-fire estimate of 300 emergent individuals at Hains Swamp, and 367 at the other subpopulations in 2025) and there is no quantitative data on the possible rate of reductions across the remainder of the species' known distribution over three generations. Although an overall population reduction of ≥30% may be plausible (*i.e.*, meeting the threshold for Vulnerable), the large number of assumptions required to support that calculation are counter to an evidence-based assessment approach.

Conclusion

There are insufficient data to assess *Prasophyllum caricetum* under Criterion A.

Criterion B Geographic range

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

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Outcome

Prasophyllum caricetum is eligible for listing as Critically Endangered under Criterion B1ab(iii,v)

EOO and AOO

Prasophyllum caricetum has an estimated area of occupancy (AOO) of 16 km², and an estimated extent of occurrence (EOO) of 21 km².

Number of threat-defined locations

Prasophyllum caricetum is found at 1–3 threat-defined locations when considering the most serious plausible threat of herbivory and habitat degradation by feral pigs. The minimum plausible number (*i.e.*, one location) is used in this assessment in accordance with a precautionary approach.

Severely fragmented

Prasophyllum caricetum does not meet the IUCN (2024) definition of severely fragmented because >50% of the species' individuals are likely to occur in a viable subpopulation.

Continuing decline

For *Prasophyllum caricetum*, there is an inferred continuing decline in habitat quality and number of mature individuals attributed to anthropogenic habitat degradation and damage to, or consumption of, stems, tubers and/or habitat by pigs, deer, rabbits, and cattle.

Extreme fluctuations

Prasophyllum caricetum is not known to undergo extreme fluctuations in geographic distribution, number of locations or subpopulations, or number of mature individuals.

Conclusion

Prasophyllum caricetum is eligible to be listed as Critically Endangered because (1) it has a very highly restricted geographic distribution with an estimated EOO of 21 km², (2) the minimum plausible number of threat-defined locations when considering the most serious plausible threat of herbivory and habitat degradation by feral pigs is one, and (3) there is an inferred continuing decline in habitat quality and number of mature individuals attributed to anthropogenic habitat degradation and damage to, or consumption of, stems, tubers and/or habitat by pigs, deer, rabbits, and cattle.

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Criterion C Small population size and decline

C. Small population size and decline			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND 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			

Outcome

Prasophyllum caricetum is considered data deficient under Criterion C.

Number of mature individuals

The estimated population for *Prasophyllum caricetum* is 4,035 (388–9,700) mature individuals.

Continuing decline

For *Prasophyllum caricetum*, there is an inferred continuing decline in the number of mature individuals attributed to damage to, or consumption of, stems and tubers by pigs, deer, rabbits, and cattle, as well as anthropogenic habitat degradation. There is insufficient monitoring data to quantify this decline into the future.

Mature individuals in each subpopulation

The largest known subpopulation of *Prasophyllum caricetum*, Nunnock Swamp, contains an estimated minimum of ~2,200 (212–5,300) mature individuals. The calculation for this subpopulation follows the same as that used to estimate the total population size (see 'Abundance' section) and is a precautionary 40% of the sum of the theoretical maximum estimate for Nunnock Swamp (*i.e.*, 5,300 individuals) and the approximate number of individuals detected in the most recent surveys of Nunnock Swamp (*i.e.*, 212).

% of mature individuals in a single subpopulation

The largest known subpopulation of *Prasophyllum caricetum*, Nunnock Swamp, is estimated to contain ~55% of mature individuals (assuming that the 2025 survey represents the relative proportions of each subpopulation, given that presurvey rainfall is likely to be similar and all were surveyed 5 years or more after fire).

Extreme fluctuations

Prasophyllum caricetum is not known to undergo extreme fluctuations in the number of mature individuals.

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Conclusion

Although *Prasophyllum caricetum* is estimated to have a moderately low number of mature individuals and there is an inferred continuing decline, the remaining subcriteria for listing as Vulnerable are not met (C2) and data deficient (C1).

Criterion D *Very small or restricted population*

D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km ² or number of locations ≤ 5

Outcome

Prasophyllum caricetum is eligible for listing as Vulnerable under Criterion D2.

Number of mature individuals

The estimated population for *Prasophyllum caricetum* is 4,035 (388–9,700) mature individuals.

Risk of future extinction in a very short amount of time (D2)

Prasophyllum caricetum occurs at 1–3 threat-defined locations and has an estimated AOO of 16 km². Feral pig activities could rapidly drive the species to extinction, particularly if compounded by reduced pig control activities, anthropogenic habitat degradation and human-induced changes to rainfall and fire regime.

Criterion E *Quantitative Analysis*

E. Quantitative Analysis			
	Critically Endangered	Endangered	Vulnerable
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

Outcome

Prasophyllum caricetum is considered data deficient under Criterion E.

Probability of extinction

There is currently insufficient information to undertake a quantitative analysis to determine the extinction probability of *Prasophyllum caricetum*.

Conservation and Management Actions

Prasophyllum caricetum is currently not listed on the NSW *Biodiversity Conservation Act 2016*. Following publication of a Final Determination by the NSW Threatened Species Scientific Committee, a Biodiversity Conservation Program will be developed by the NSW Department of Climate Change, Energy, the Environment and Water.

The actions listed below are general suggestions only.

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Habitat loss, disturbance and modification

- Control feral animals and exotic plants and maintain at low levels.

Stakeholders

- Inform landholders and managers of sites where there are known subpopulations and consult with these groups regarding options for conservation management and protection of the species.

Survey and monitoring

- Search areas with previous records or potential habitat to quantify additional subpopulations.
- Conduct annual counts of flowering individuals to track species abundance/condition/pollination success over time.
- Monitor feral animal activities and density of exotic plants.

Information and research priorities

- Investigate the extent to which native and feral herbivores may be contributing to stem damage, mortality or disruption of reproduction.

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APPENDIX 1

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome:

Prasophyllum caricetum was found to be Critically Endangered under Clause 4.3(a)(d)(e i,iii).

Clause 4.2 – Reduction in population size of species

(Equivalent to IUCN criterion A)

Assessment Outcome: Data Deficient

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 - Restricted geographic distribution of species and other conditions (Equivalent to IUCN criterion B)

Assessment Outcome: Critically Endangered under Clause 4.3(a)(d)(e i,iii)

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,

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	(iv)	the number of locations in which the species occurs or of populations of the species,
	(f)	extreme fluctuations occur in any of the following:
	(i)	an index of abundance appropriate to the taxon,
	(ii)	the geographic distribution of the species,
	(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 - Low numbers of mature individuals of species and other conditions (Equivalent to IUCN criterion C)

Assessment Outcome: Data Deficient

The estimated total number of mature individuals of the species is:		
(a)	for critically endangered species	very low, or
(b)	for endangered species	low, or
(c)	for vulnerable species	moderately low,
and either of the following 2 conditions apply:		
(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):	
	(i)	for critically endangered species very large, or
	(ii)	for endangered species large, or
	(iii)	for vulnerable species moderate,
(e)	both of the following apply:	
	(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and
	(ii)	at least one of the following applies:
	(A)	the number of individuals in each population of the species is:
	(I)	for critically endangered species extremely low, or
	(II)	for endangered species very low, or
	(III)	for vulnerable species low,
	(B)	all or nearly all mature individuals of the species occur within one population,
	(C)	extreme fluctuations occur in an index of abundance appropriate to the species.

Clause 4.5 - Low total numbers of mature individuals of species (Equivalent to IUCN criterion D)

Assessment Outcome: Not met

The total number of mature individuals of the species is:		
(a)	for critically endangered species	extremely low, or
(b)	for endangered species	very low, or
(c)	for vulnerable species	low.

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Clause 4.6 - Quantitative analysis of extinction probability (Equivalent to IUCN criterion E)

Assessment Outcome: Data Deficient

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species–vulnerable species

(Equivalent to IUCN criterion D2)

Assessment Outcome: Vulnerable under Clause 4.7

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.
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