

## *Prasophyllum fosteri* Shelford Leek-orchid

### Taxonomy

*Prasophyllum fosteri* D.L. Jones

The taxon may have been confused with *Prasophyllum frenchii* but is readily distinguished by its smaller habit and very open flowers with a smooth labellum callus.

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2001).

Categorised as Endangered in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

### Proposed conservation status

Critically Endangered in Australia

Criteria A2ace+3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(i,ii); D

### Species Information

#### Description and Life History

The taxon is a spring-flowering, deciduous, terrestrial orchid. It has a flowering stem 20-40 cm tall. Leaf-blade to 15 cm long, 2-4 mm diam. at base, green, apex lax, often withered at flowering. Flowers 10-25, fragrant, green to reddish brown, subsessile in a sparse to moderately dense spike 6-12 cm long; ovary obovoid, 4-5 mm long, green; sepals 7-8 mm long, dorsal sepal ovate-lanceolate, forward pointed, lateral sepals free, linear-lanceolate, nearly parallel, erect to recurved; petals 6-7 mm long, linear to linear-obovate, incurved, blunt. Labellum ovate, 5-6 mm long, white or pinkish, recurved at right angles near the middle, margins crinkled; apex triangular, subacute; callus plate much-raised, broad, extending almost to labellum apex. Column appendages ovate-elliptic, c. 2 mm long, obtuse. The taxon flowers from September to October (VicFlora 2018).

The pollinator(s) of most *Prasophyllum* species is not known, but as the flowers produce nectar, they are visited by a wide range of potential pollinator insects. The critical habitat has not been determined, but fire or other disturbance such as slashing is highly likely to promote flowering (DSE 2003).

Plants can reach their maximum height and flower count in years of good winter rainfall, although they can be hard to detect as the plants are often overgrown by the surrounding grasses and other vegetation. The plants are usually much shorter with fewer, smaller flowers in dry years (Backhouse et al. 2016).

#### Generation Length

The generation length of *Prasophyllum fosteri* is suspected to be 40 to 50 years. Generation time for non-colonial terrestrial orchids is estimated based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, each individual is susceptible to endogenous exhaustion or environmental causes of mortality at rates likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators (OSRs) reliant on seed-based recruitment for population maintenance.

## Distribution

The taxon is endemic to Victoria, where it is known only from a single site on a roadside strip about 1 km in extent, near Shelford in the south-west. Specifically, it occurs in the Shelford-Mt Mercer area within the Victorian Volcanic Plain (DSE 2003; VicFlora 2018), managed by Golden Plains Shire (Duncan and Coates 2010). The taxon occurs at an altitude of 160 metres above sea level (Backhouse et al. 2016).

The taxon was only ever known from a single location, but plants have disappeared from most of this area in recent years due to drying conditions, weed invasion and vehicle disturbance. However, the taxon was almost certainly much more widespread across the region, but virtually all suitable habitat has long since been cleared for agriculture. The taxon is currently known from a single location and fewer than 20 plants. The one known population has suffered an alarming decline in numbers within the last 15 years, from perhaps 200 plants to fewer than 20 plants, with only 2 plants seen in the last 5 years, and it may already be extinct.

## Habitat

The taxon grows in remnant herb-rich native grassland on heavy black basalt soils with embedded basalt rocks (Backhouse et al. 2016). The area is dominated by *Themeda triandra* (Kangaroo Grass), with perennial herbs and lilies on poorly drained red-brown soil derived from basalt. The site forms part of the Natural Temperature Grassland of the Victorian Volcanic Plains' and the 'Western (Basalt) Plains Grasslands Community'.

## Threats

The remaining native grassland habitats are now largely restricted to small, highly fragmented patches, and mostly confined to road and rail reserves. The taxon is at substantial risk of damage and disturbance from vehicle movement, machinery, utility earthworks and stock droving (Backhouse et al. 2016). The site is at further risk from weed invasion. Furthermore, being confined to a single location means that the taxon is particularly prone to stochastic events threatening its survival.

Current and potential threats to the taxon include disturbance/destruction (all sites are on roadsides or rail reserves and are subject to accidental from road and utilities maintenance activities, stock movement and vehicle and farm machinery movement); weed invasion (including *Phalaris aquatica*, *Romulea rosea* and *Cuscuta dubia* present on or near the site, exacerbated by soil disturbance); and altered fire regimes (as the taxon probably requires periodic fire to reduce accumulation of grasses, especially Kangaroo Grass, which otherwise may suppress growth and/or flowering if grass swards become too dense) (DSE 2003; Duncan and Coates 2010).

## IUCN Criteria

Criterion 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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p>			
<p>based on any of the following:</p> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## Evidence:

### Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 120 to 150 years is inferred to be 90 to 99%, based on (a), (c) and (e) above.

The taxon was almost certainly much more widespread across the region, but virtually all suitable habitat has long since been cleared for agriculture. The taxon is currently known from a single locality and has suffered a serious decline in numbers.

The causes of the reduction may not have ceased, be understood or be reversible.

### Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 90 to 100 years is projected to be 90 to 100%, based on (c) and (e) above.

Only two plants have been seen in recent years, and it may already be extinct. Furthermore, the remaining habitat is threatened by the ongoing effects of drying conditions, weed invasion and vehicle disturbance.

### Eligible under Criterion A4 as Critically Endangered

The population reduction over any 120 to 150 year period, including both past and future (up to 100 years in the future), is inferred to be 90 to 100%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Only two plants have been seen in recent years, and it may already be extinct. Furthermore, the remaining habitat is threatened by the ongoing effects of drying conditions, weed invasion and vehicle disturbance.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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			

## Evidence:

### Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to have one location, as it occurs on one site and the identified threats have the potential to damage or wipe out the entire population. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

### Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has one location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Criterion 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 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				

## Evidence:

### Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 1 to 20 mature individuals, based on sporadic surveys and VBA records.

The number of mature individuals is projected to continue to decline, the number of mature individuals in each subpopulation is 50 or fewer and the percentage of mature individuals in one subpopulation is 90-100 %.

Only two plants have been seen in recent years, and it may already be extinct. Furthermore, the remaining habitat is threatened by the ongoing effects of drying conditions, weed invasion and vehicle disturbance. Therefore, continuing decline in population size is projected.

Criterion D - Very small or restricted population <sup>Ⓜ</sup>			
	Critically Endangered <sup>Ⓜ</sup>	Endangered <sup>Ⓜ</sup>	Vulnerable <sup>Ⓜ</sup>
Number of mature individuals (observed or estimated) <sup>Ⓜ</sup>	<50 <sup>Ⓜ</sup>	<250 <sup>Ⓜ</sup>	<1,000 <sup>Ⓜ</sup>
D2 - Only applies to the VU category <sup>Ⓜ</sup> 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. <sup>Ⓜ</sup>	- <sup>Ⓜ</sup>	- <sup>Ⓜ</sup>	D2 - Typically: <sup>Ⓜ</sup> AoO < 20 km <sup>2</sup> or number of locations ≤ 5 <sup>Ⓜ</sup>

## Evidence:

### Eligible under Criterion D as Critically Endangered

The taxon is estimated to have 1 to 20 mature individuals.

**Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.**

## References

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- SAC (2001). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 508 *Prasophyllum fosteri*.
- VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Prasophyllum fosteri*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/5da95b03-a08e-4865-8a17-ec41c373708b>