Threatened Species Assessment

Prasophyllum barnettii
Elegant Leek-orchid

Taxonomy

Prasophyllum barnettii D.L. Jones & D.T. Rouse

This species is part of the *Prasophyllum pyriforme* complex and was known as previously known as *Prasophyllum* sp. aff. *pyriforme* A.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2007).

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

Proposed conservation status

Endangered in Australia

Criterion A2ac; B1ab(iii,v)+2ab(iii,v); C2a(i)

Species Information

Description and Life History

A deciduous, terrestrial, perennial, herb with an underground tuber. It has a single erect terete basal green leaf up to 120 mm (5 in) long and 2-3 mm (0.08-0.1 in) wide at the base. An erect flower stem up to 30 cm tall, bearing between twelve and thirty, thirty scented yellowish, reddish or brownish flowers are arranged along a thin flowering spike 70-120 mm (3-5 in) long reaching to a height of 200-350 mm (8-10 in). The flowers have with incurved petals, a short, broad, sharply tapered labellum, a thick tapered callus, and a column with the stigmatic plate longer than the anther but of similar length to the column wings.

As with others in the genus, the flowers are inverted so that the labellum is above the column rather than below it. The dorsal sepal is egg-shaped to lance-shaped, 7-10 mm (0.3-0.4 in) long. The lateral sepals are a similar size and shape to the dorsal sepal and are sometimes joined to each other near their bases. The petals are linear in shape and about 6-8 mm (0.2-0.3 in) long. The labellum is reddish or white, 6-8 mm (0.2-0.3 in) long, turns upwards at about 90° and has slightly wavy edges. Flowering occurs from October to December.

Flowering plants are seen so infrequently that it is hard to estimate current population trends. The taxon flowers most profusely after summer bushfires, and the number of flowering plants declines rapidly in subsequent years. The species is a 'fire-follower', flowering profusely the season following a hot summer fire, with flowering declining sharply in subsequent years as the vegetation regenerates.

Generation Length

The generation length of *Prasophyllum barnettii* is estimated to be 20 to 40 years. Generation time for non-colonial terrestrial orchids is estimated to be a nominal 30 years, 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 known from only two sites, at Crinoline Creek in the Otway Range, and at Mt Ingoldsby near Anglesea. At Anglesea, a few plants usually flower every year along a slashed fire break. Plants have not been seen at Crinoline Creek for several years now.

Habitat

The taxon occurs in dense coastal heathy woodland on grey sandy loam soils, and grows with grasses or shrubs in forest (Otway Ranges) and coastal areas (between Anglesea and Princetown).

Threats

Altered fire regimes may pose the greatest risk; long-term fire management of its heathy woodland habitat for conservation of the species is a major challenge. Habitat is declining through the ongoing impacts of disturbance and increasingly dry conditions from reducing rainfall. Plants at Anglesea have been damaged by vehicle movement along tracks. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

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%

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

Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 60 to 120 years is suspected to be 50%, based on (a) and (c) above and on old records of distribution.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is suspected to be 10 to 40%, based on (a) and (c) above. This is based on past land clearing and an inferred future decline from declining habitat conditions. The causes of reduction may not have ceased, be understood or be reversible.

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 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Evidence:

Eligible under Criterion B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 164 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

Considering the limited dispersal ability of the taxon, the barriers to dispersal, or lack of habitat separating them, the subpopulations can be considered to be severely fragmented.

It is inferred to have two locations. It has a continuing decline in (iii) and (v) above.

There may be a decline in habitat through some ongoing disturbance and the impact of increasingly dry conditions from reducing rainfall, which may lead to a loss in numbers.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 16 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is inferred to be severely fragmented, to have two locations, and has a continuing decline in (iii) 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 C as Endangered

It is estimated that there are 300 to 500 mature individuals, although in most years substantially fewer than 50 flowering plants across all subpopulations are seen, with some subpopulations not flowering at all. The taxon flowers most profusely after summer bushfires, when several hundred flowering plants can be seen in the Anglesea subpopulation.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	< 50	< 250	< 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 species to critically endangered or Extinct in a very short time.	-	-	D2. Typically: AoO < 20 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Vulnerable

The taxon is estimated to have 300 to 500 mature individuals, and is estimated to be very restricted.

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

References

Backhouse, G. and Cameron, D. (2005). Application of IUCN 2001 Red List Categories in Determining the Conservation Status of Native Orchids of Victoria, Australia. *Selbyana* 26(1,2): 58-74.

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