Threatened Species Assessment

Pterostylis boormanii
Sikh's Whiskers

Taxonomy

Pterostylis boormanii Rupp

The taxon forms sporadic hybrids with *Pterostylis setifera*. An undescribed taxon from the Beechworth area has porrect flowers (nodding in *P. boormanii*), less concave lateral sepal bases and a different shaped labellum (referred to as *Pterostylis* sp. aff. *boormanii* (Beechworth) (VicFlora 2019).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion A2ce+4ce; B2ab(i,ii,iii,iv,v); C2a(i); D

Species Information

Description and Life History

The taxon is a flowering plant to 20 cm tall, stem leaves 2-5, closely sheathing. Rosette leaves 8-14, elliptic to oblong, 2-3 cm long, 6-10 mm wide, margins shortly ciliate. Flowers 2-7, nodding, 2.7-3 cm long, dark reddish-brown with transparent areas in the petals and galea; dorsal sepal with an upcurved filiform point 8-10 mm long; lateral sepals deflexed, conjoined part broadly ovate in outline when flattened, deeply concave, margins slightly incurved, densely ciliate, free points filamentous, 10-15 mm long, curved forwards, widely divergent 1.5-2 cm apart at the tips; petals with a poorly developed proximal flange. Labellum ovate-oblong, 5-5.5 mm long, c. 2 mm wide, brown, thick; marginal hairs in 5-8 pairs, 1-3.5 mm long, white, spreading; basal lobe erect, with numerous hairs c. 0.5 mm long. The taxon flowers from October to November (VicFlora 2019).

The taxon belongs to a complex of orchids known as Rustyhoods. Both flowering and non-flowering plants have a basal rosette of leaves (usually withered by flowering time). The flower stem bears multiple translucent greenish, brownish, or reddish flowers. The lateral sepals are deflexed, joined in the basal part and end in short to long free points. The labellum is generally rounded, un-lobed, is fully visible when in the set position, and has sparse, short to long bristles. All taxa multiply only from seed, and generally form sparse, scattered populations.

Generation Length

The generation length of *Pterostylis boormanii* is suspected to be 20 to 40 (midpoint 30) 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, every 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 as they are reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is very sparsely scattered throughout Victoria and, although it is widely distributed, all scattered populations are small. It potentially once occurred across a much larger area of occupancy. The taxon has also been recorded in South Australia and New South Wales.

Habitat

The taxon is scattered across drier inland parts of Victoria in Box/Ironbark forests, dry woodlands, and mallee scrub on well-drained gravelly soils (VicFlora 2019).

Threats

Subpopulations and habitat are considered at risk from inappropriate fire regimes, a lack of pollinators, and increasingly dry conditions from declining rainfall and a subsequent increase in severity and intensity of bushfires. The taxon has very small subpopulations, which may be highly susceptible to stochastic events that may cause major decline or local extinction within a very short time frame.

This taxon is highly dependent on conservation actions, if no future management takes place the taxon is likely to become Critically Endangered or Extinct. The assessment was made under the assumption of continuity of the current investment in conservation.

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 30 to 90 years is estimated to be 50%, based on (c) and (e) above.

Past decline is based on habitat clearing and degradation, and the rate of habitat loss in the Box/Ironbark region of central Victoria. It can be assumed that a conservative 50% reduction in populations has taken place since European settlement. Currently, there are very small patches of habitat remaining.

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

Eligible under Criterion A4 as Endangered

The population reduction over any 30 to 90 year period, including both past and future, is estimated to be 20 to 50%, based on (c) and (e)above. The causes of reduction may not have ceased, be understood or be reversible.

Past decline is based on habitat clearing and loss. Due to a lack of conservation efforts, inappropriate site management and climate change, it can be safely assumed that the taxon will continue to decline unless conservation interventions are initiated.

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 Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 18,665 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the landscape scale. Geographically isolated stands occur at separations typically exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 48 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented 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 C1 as Vulnerable

It is estimated that there are 190 to 400 mature individuals based on the area of potential habitat and known individuals at recorded sites.

There is estimated to be a continuing decline of 20% within three generations.

Eligible under Criterion C2 as Endangered

It is estimated that there are 190 to 400 mature individuals, this number is projected to continue to decline, and the number of mature individuals in each subpopulation is fewer than 250.

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 Endangered

It is estimated that there are 190 to 400 mature individuals.

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

References

Backhouse, G., and Jeanes, J. (2006). *Wild Orchids of Victoria Australia.* Seaford, Victoria: Aquatic Photographics.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014.* Department of Environment and Primary Industries, Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Pterostylis boormanii.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/e373d29f-2d75-4d4e-856a-5d180772f7bd