Threatened Species Assessment

Pterostylis grandiflora
Cobra Greenhood

Taxonomy

Pterostylis grandiflora R. Br.

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 B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The Cobra Greenhood is a flowering plant to 40 cm tall, stem leaves 4-9. Rosette leaves 4-9, ovate, 0.5-2 cm long, 0.3-1 cm wide, petiolate, margins crisped. Flower 2.7-3.5 cm long, erect, green and white with deep red-brown suffusions in the galea; dorsal sepal acuminate to long-acuminate, decurved; lateral sepals erect, tightly embracing the galea, sinus flat or raised, protruding like a platform when viewed from the side, free points 3-5 cm long, filiform, erect; petal margins widely flared. Labellum oblong-ovate in basal half, suddenly tapered to a long linear-filiform section, 17-22 mm long, 3-3.5 mm wide, expanded and brown at the apex, the distal half protruding from the sinus in the set position (VicFlora 2015).

The taxon flowers from May to September. Some populations can be large, numbering hundreds of plants, but usually with only a low proportion of plants in flower. It has a protracted flowering period, with the first flowers opening in late April in some years, and it is not uncommon to see plants still flowering in early spring, especially after good winter rains (Backhouse et al. 2016).

Generation Length

The generation length of *Pterostylis grandiflora* is estimated to be 20 to 40 years (midpoint 30 years). This is based on the 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 reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is distributed through eastern Victoria from near Melbourne to the New South Wales (NSW) border. The altitude range is from 5-350 metres above sea level. The taxon also occurs in Tasmania, NSW, and Queensland (Backhouse et al. 2016).

Habitat

The taxon grows in heathy woodland, lowland, and foothill forest on moist, shady slopes on sandy to light clay loam soils (Backhouse et al. 2016; VicFlora 2015).

Threats

The taxon has declined markedly in the Dandenong Ranges near Melbourne, where it is at the western end of its range. This is likely as a result of development and human activity pressures from the expanding of residential areas in the region. However, it becomes more common further east, and can be locally common in foothill forest in East Gippsland (Backhouse et al. 2016).

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 Vulnerable

The population reduction over the past 60 to 120 years is estimated to be 20 to 40%, based on (a) and (c) above.

This is based on some past loss of populations in the western end of the range of the taxon, particularly on the eastern edge of Melbourne.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 300 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is inferred to be severely fragmented considering its limited dispersal ability, the barriers to dispersal, and/or the lack of habitat separating the subpopulations.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the impacts of disturbance and weed invasion, increasingly dry conditions from reducing rainfall, and a consequent increase in intensity and severity of bushfires.

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:

Ineligible under Criterion C

It is estimated that there are 30,000 to 60,000 mature individuals, which exceeds the thresholds for criterion C.

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:

Ineligible under Criterion D

It is estimated that there are 30,000 to 60,000 mature individuals, which exceeds the thresholds for criterion D.

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

References

Backhouse, G., Kosky, B., Rouse, D., and Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia.* Melbourne, Victoria: EBook.

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 (2015). Flora of Victoria, Royal Botanic Gardens Victoria: *Pterostylis grandiflora*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0c2d28e2-628d-4f34-864c-03fa492e5099