Threatened Species Assessment

Pterostylis despectans
Lowly Greenhood

Taxonomy

Pterostylis despectans (Nicholls) M.A. Clem. & D.L. Jones

Current conservation status

Listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1993).

Categorised as Endangered 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 taxon is a small, inconspicuous, deciduous, terrestrial orchid. After an autumn dormancy survived by the root tuber, a rosette of five to ten leaves 1-1.8cm long and 6-9mm wide, appears in June. The three or four stem-leaves are reduced to sheathing bracts. The rosette withers before flowering time.

The flowering stem reaches 5-8cm tall, though it is often only 2-3cm. During the two to three month flowering period (December to January), it produces up to six short, stout flowers which are translucent grey-green to brown, very similar to the colour of the leaf litter in which it grows. These flowers are on slender stalks 1-3cm long, and open one at a time, facing downwards, often touching the soil, with their long sepals. The dark brown labellum, a specialised petal, springs closed when an insect or small object touches it and has 6-18 pairs of marginal hairs as well as a pair of prominent, erect hairs at its base, which is constricted (DSE 2008).

The taxon is remarkable for its dwarf habit, long pedicels and the often deflexed flowers with the free points of the lateral sepals commonly touching the soil surface (VicFlora 2018).

Generation Length

The generation length of *Pterostylis despectans* is estimated 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 reliant on seed-based recruitment for population maintenance.

Distribution

Pterostylis despectans is located mostly in large numbers in the Goldfields region of central Victoria, with Maryborough, St Arnaud and Dunolly holding most of these Victorian populations (DSE 2008). There is an outlying population recorded south of Horsham and a population recorded in the Terrick Terrick National Park has potential to be a different taxon and taxonomic revision is required.

Habitat

Based on current Ecological Vegetation Class (EVC) mapping, most of the known populations are found within Low Rises Grassy Woodland or Box Ironbark Forest EVC. Where they occur in Box- Ironbark Forest EVC, it is generally close to the boundary with Low Rises Grassy Woodland, in the transition zone between the two vegetation classes. In the Talbot Nature Conservation Reserve, some populations fall within areas mapped as Alluvial Terraces Herb-Rich Woodland, but almost always close the boundary with either Box-Ironbark Forest or Low rises Grassy Woodland.

On most sites, the dominant Eucalypt is *Eucalyptus leucoxylon*, with *E. microcarpa* sub-dominant at some sites, and *E. melliodora* occasionally present where sites extend lower into the alluvial terraces.

The understorey is usually sparse, although *Cassinia arcuata* can be quite dense on some sites where timber harvesting has resulted in the canopy layer being substantially removed in the past. Other typical understorey species include *Acacia pycnantha, Acacia paradoxa, Acacia acinacea*, and occasionally *Pimelea humilis an*d *Dillwynnia* spp. Groundcover species typically include *Dianella admixta, Hibbertia exutiaces*, *Astroloma humifusum*, and a range of terrestrial herbs and other orchid taxa.

Threats

Subpopulations and habitat are considered at risk from browsing pressure, inappropriate fire regimes and increasingly dry conditions from declining rainfall and consequent increase in severity and intensity of bushfires. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

Gold exploration and mining is a potential threat to the taxon. However, as the known populations occupy only a few hectares, restriction of mining from sites supporting the Lowly Greenhood orchid should occur as it will have negligible impact on these activities. Mining activity in the area has declined since the 1988-1994 mini-boom, which peaked in 1992-1993, when ephemeral doze-and detect operators caused considerable damage in the area.

Previously considered very rare in Victoria, through the period of 2000 to 2015, large scale search efforts throughout central Victoria uncovered numerous new populations and increased the known individuals from less than 500 to almost 10,000. Although this work has increased the known populations, there are still current operating threats, including inappropriate fire regimes, prospecting activities, and climate change.

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 10 to 30%, based on (c), (d) and (e) above.

Past decline is based on land clearing of the taxon's potential available habitat.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 60 to 100 years is suspected to be 20 to 40%, based on (c), (d) and (e) above.

Recent conservation efforts have seen the taxon increase in known populations, through intensive search efforts. However, as the taxon is still dependent on conservation actions, there is a chance of future decline due to the identified threats.

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 estimated to be 10 to 35%, based on (c), (d) and (e) above.

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 200 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the regional and/or landscape scales and anthropogenically at the regional and/or landscape scale, with no specialised mechanism for long-range dispersal. Therefore, there is a reduced probability of recolonisation should subpopulations become extinct.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats. Specifically, continuing dry seasons are having an impact on populations, as well as issues such as inappropriate fire regimes and fossicking. Ultimately, without habitat protection, the quality of the habitat will continue to decline.

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 7,850 to 10,220 mature individuals. Approximately 98% of the known Victorian populations have been monitored more than once in the past ten to fifteen years and expensive search efforts have uncovered all expected populations within the known distribution for this taxon in the central Goldfields. The population at Horsham and the population in Inglewood are less regularly monitored.

There is estimated to be a continuing decline of 20 to 40% within three generations.

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 7,850 to 10,220 mature individuals.

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

References

DSE (2008). Action Statement - *Pterostylis despectans* Lowly Greenhood (No. 123). Department of Sustainability and Environment. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0020/32636/Lowly_Greenhood_Pterostylis_despectans.pdf

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

SAC (1993). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 277 *Pterostylis despectans*.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Pterostylis despectans*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/edbe4f59-62af-4087-a37f-c87d45506b36