Threatened Species Assessment

Pterostylis hamata
Scaly Greenhood

Taxonomy

Pterostylis hamata Blackmore & Clemesha

The taxon is distinguished readily by the smallish, mostly brown flowers with the free points on the lateral sepals hooked strongly forward (VicFlora, 2015).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2ace+4ace; B1ab(iii,v)+2ab(iii,v); C2a(i); D

Species Information

Description and Life History

The taxon is a flowering plant to 40 cm tall, stem leaves 2-8, closely sheathing. Rosette leaves 6-15, elliptic to obovate, 2-3 cm long, 6-12 mm wide, margins entire. Flowers 2-12, porrect to obliquely erect, c. 2 cm long, transparent with green and brown markings and suffusions; dorsal sepal with decurved filiform point 4-7 mm long; lateral sepals deflexed, conjoined part ovate in outline when flattened, concave, margins incurved, glabrous, free points filamentous, 12-15 mm long, hooked forwards, nearly parallel, c. 10 mm apart at the tips; petals with well-developed proximal flanges which meet and block off the base of the galea. Labellum oblong-ovate, 5-5.5 mm long, 2-2.5 mm wide, brown, thick; marginal hairs in 8-10 pairs, 0.5-2.5 mm long, basal lobe poorly developed, with numerous hairs c. 1 mm long. The taxon flowers from October to December (VicFlora 2015).

The tubers are apparently able to withstand extreme desiccation through the hot dry summers. Most subpopulations have very low numbers of flowering plants each year, with some subpopulations not flowering in dry years.

Generation Length

The generation length of *Pterostylis hamata* 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 are(OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is apparently confined to north-eastern Victoria between Boweya and Corryong. The altitude ranges from 290-900 metres above sea level. The taxon is known from few, generally small subpopulations scattered through the foothills and mountains in fairly rugged habitat that is not easy to search, therefore it may be under-reported or more common than current records suggest (Backhouse *et al*., 2016, VicFlora 2016).

At least 1 subpopulation appears to have become extinct. Plant numbers in at least 3 subpopulations have declined in recent decades due to bushfires and other disturbance. The taxon also occurs in Queensland, New South Wales, and the Australian Capital Territory.

Habitat

The taxon grows near or on isolated granite peaks in the foothills of dry open forest and woodland, often under Black Cypress-pine *Callitris endlicheri*, usually on well-drained, shallow, sandy, gravelly, loam soils. Small groups of plants can be seen growing on moss mats on large granite boulders exposed to full sunlight (Backhouse *et al*., 2016; VicFlora 2015).

Threats

Subpopulations and habitat are considered at risk from disturbance, weed invasion and increasingly dry conditions from declining rainfall and a consequent increase in the 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.

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 inferred to be 30 to 50%, based on (a), (c) and (e) above.

Past decline is based on the decline in habitat condition and the effects of bushfires and other disturbance.

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

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is inferred to be 5 to 50%, based on (a), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Future decline is based on declining habitat conditions.

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 2,649 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, based on its limited dispersal ability, the barriers to dispersal and/or the lack of habitat separating them. Such fragmentation precludes the possibility of recolonisation in the event of local extinction.

It is estimated to have 1 location, based on the uniform impact of the identified threats, including disturbance, weed invasion and increasingly dry conditions from declining rainfall, and a consequent increase in the severity and intensity of bushfires.

It has a continuing decline in (iii) and (v) above based on the current and projected identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 55 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is estimated to be severely fragmented, is estimated to have 1 location 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 C2 as Endangered

It is estimated that there are 210 to 360 mature individuals, based on sporadic surveys and VBA records.

The number of mature individuals is inferred 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

The taxon is estimated to have 210 to 360 mature individuals.

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.

VicFlora (2015). Flora of Victoria, Royal Botanic Gardens Victoria: *Pterostylis hamata*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/ab2a65c9-6c5c-4491-9bb6-4d2b8e26b362