Threatened Species Assessment

Pterostylis chlorogramma
Green-striped Greenhood

Taxonomy

Pterostylis chlorogramma D.L. Jones & M.A. Clem.

Other name: *Bunochilus chlorogrammus* (Backhouse et al., 2016).

The taxon is distinguished from *Pterostylis smaragdyna* by its smaller, paler flowers and a smaller labellum with less developed lateral lobes. Some plants of intermediate size can be difficult to assign to either *P. chlorogramma* or *P. smaragdyna* (VicFlora 2018).

Current conservation status

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

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2006).

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

Proposed conservation status

Endangered in Victoria

Criteria A2bce+3ce+4bce; B2ab(i,ii,iii,iv,v); C1

Species Information

Description and Life History

The taxon is a small, terrestrial deciduous herb that is summer-dormant and emerges annually from a spherical subterranean tuber. Non-flowering plants produce a rosette of 3-6 narrowly ovate, pointed leaves, either ground-hugging or on a short stem several cm off the ground. Flowering plants lack a basal rosette and produce a long slender stem to 45 cm tall with several narrow sheathing bracts, and up to seven small, glossy, green-striped flowers with an emerald green (rarely brownish) labellum. The dorsal sepal and petals are united to form a galea to 12 mm long, the petals with prominent flanges. The lateral sepals are deflexed and united for most of their length. The labellum is oblong, slightly curved, with two short, upturned hooks at the apex, and is attached to the base of the column by a moveable claw that is triggered by a pollinator (typically small gnats and flies) landing on it, propelling the labellum against the column. Flowering occurs from July to early September and plants reproduce entirely from seed (Backhouse and Jeanes, 1995; Duncan *et al.* 2009).

Generation Length

The generation length of *Pterostylis chlorogramma* 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, 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 as they are reliant on seed-based recruitment for population maintenance.

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Distribution

The exact range of the taxon is uncertain due to confusion with closely allied species (VicFlora 2018). It is sporadically distributed across southern Victoria west from Sale, and extending inland to the southern edge of the Little Desert in western Victoria. The altitude ranges from 50-400 metres above sea level. It also occurs in South Australia, Queensland, and New South Wales.

Habitat

The taxon occurs in mixed Box-Stringybark forest (*Eucalyptus obliqua, Eucalyptus radiata, Eucalyptus cephalocarpa* and *Eucalyptus cypellocarpa*) with a shrubby understorey, often with *Pteridium esculentum* as a major component, and including *Hakea ulicina, Dillwynia glaberrima, Pultenaea scabra, Banksia spinulosa, Epacris impressa, Acacia mucronata, Leptospermum laevigatum, Monotoca scoparia*, and *Bursaria spinosa*, on sandy or clay well-drained loam soils. Plants appear to be restricted to natural gaps in the shrubby understorey or occur along road/track verges (Duncan *et. al*. 2009; VicFlora 2018).

Threats

The historical range and distribution of *P. chlorogramma* is not known, but it is likely to have been more common, with populations lost due to destruction of habitat for agricultural and residential development. While the taxon remains widely distributed, all populations are small (100 plants or less), fragmented and isolated from one another. At least one (Wilsons Promontory) is probably extinct (Duncan *et al.* 2009).

The remaining populations face a range of current and potential threats, including weed invasion such as pasture grasses and flatweeds, at the Grantville, Gurdies, Lang Lang and Tallageira sites. Grazing by native herbivores (kangaroos/wallabies) and rabbits is a serious threat at all sites. The taxon is subject to destruction/disturbance of plants and habitat by road maintenance, horse riding and trail bike activity, as well as accidental trampling by people. Plants tend to be most common along road/tracks at most sites and are therefore at risk from accidental disturbance by road/track maintenance activities. There is also a high risk of extinction due to small population size at some sites (Duncan *et al.* 2009).

The bushfires of 2019/2020 are believed to have impacted around 7% of the taxon's modelled habitat as of early January 2020. The overall impacts of the fire are yet to be determined, but feral herbivores, notably Sambar Deer, drought, hot weather, and repeat fires have the potential to damage or destroy recovering plants and/or seedlings.

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 estimated to be 60 to 75%, based on (b), (c) and (e) above.

This is based on destruction of habitat for agricultural and residential development (Duncan *et al*. 2009). The bushfires of 2019/2020 are believed to have impacted around 7% of the taxon's modelled habitat as of early January 2020. The overall impacts of the fire are yet to be determined, but feral herbivores, notably Sambar Deer, drought, hot weather, and repeat fires have had the potential to damage or destroy recovering plants and/or seedlings.

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is projected to be 25 to 55%, based on (c) and (e) above.

This is based on the identified threats, including grazing, weed invasion, site disturbance or destruction due to human activity and the high risk of extinction due to the small population size at some sites (Duncan *et al*. 2009).

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 estimated to be 40 to 60%, based on (b), (c) and (e) above. 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 220 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

It is estimated to have 4 locations. The subpopulations are centred on four regions and distinct threats operate in each region.

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

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 Endangered

It is estimated that there are 1,250 to 2,500 mature individuals. The taxon is currently known from four subpopulations containing about 1,000 plants (Duncan *et al.* 2009). Further searches have increased the known number since above estimate (Backhouse *et al*. 2016).

There is estimated to be a continuing decline of 15 to 30% within two 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:

Eligible under criterion D as Vulnerable

The taxon 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

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