Threatened Species Assessment

Thelymitra bracteata
Lofty Sun-orchid

Taxonomy

Thelymitra bracteata J.Z. Weber ex Jeanes

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ce+3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a flowering stem erect, straight, rather stout, 30-70(-100) cm tall, 2-7 mm diam., straw-coloured to purplish. Leaf linear-lanceolate, attenuate, 20-45 cm long, 8-15 mm wide, leathery, ribbed abaxially, blade more or less flat, sheathing at base, dark green with a purplish base. Inflorescence 5-20(-30)-flowered, open. Sterile bracts large and prominent, usually 2, sometimes 1 or 3. Pedicels of lower flowers usually partially decurrent on rachis. Perianth segments lanceolate to ovate, 6-14(-17) mm long, usually pale blue. Column (4-)5-6.5 mm long, white or greenish at base; mid-lobe expanded into a hood over the anther, tubular, curving gently through c. 90 deg., yellow with a brown to reddish brown collar, apex emarginate; lateral lobes converging, 1.2-1.7 mm long, digitiform, porrect at base, bent sharply upwards near the middle, each with a toothbrush-like arrangement of white hairs embracing the front of the mid-lobe. Anther inserted about mid-way along column, shortly beaked. The taxon flowers from September to December. The flowers are self-pollinating and only open on warm, humid days (VicFlora, 2018). This taxon is facultatively autogamous (Jeanes 2004).

The taxon is one of the tallest sun-orchids in Victoria and it also has one of the highest flower counts of any sun-orchid, being about equal to *Thelymitra media* and exceeded only by *Thelymitra aristata*, both of which have slightly larger flowers with different column arrangements.

Generation Length

The generation length of *Thelymitra bracteata* 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, 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 (OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

In Victoria, the taxon is known with certainty from only two collections in the Grampians and near Mortlake in the Victorian Volcanic Plain bioregion (VicFlora 2018). The two subpopulations occur about 85 km apart, with most plants occurring in one subpopulation. The altitude ranges from 130-250 metres above sea level. It appears to be a rare orchid in Victoria and is currently known from very few sites and low numbers of plants. However, it is almost

certainly overlooked and continues to be mistaken for other orchids (Backhouse *et al*. 2016). The taxon also occurs in South Australia and Tasmania.

Habitat

The taxon is found in grassland, grassy and shrubby woodland and open forest on heavy basalt and clay loam, more nutrient-rich soils. The taxon often occurs in disturbed sites such as forest clearings and tracks (Backhouse *et al*. 2016; Jones 2004; VicFlora 2018).

Threats

Given that the taxon occurs at two widely separated sites, it is likely to have been more widespread and abundant, especially on the basalt plains, but has probably suffered a substantial decline in range and abundance from habitat destruction and degradation.

One subpopulation grows on a roadside that is subject to disturbance and weed invasion, while the second grows in reasonably intact native vegetation with little discernible threat. Both subpopulations are probably at risk from drying conditions due to decreasing rainfall. Small, isolated subpopulations are at high risk of decline and extinction from stochastic events.

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:

Ineligible under Criterion A

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 60 to 120 years is inferred to be 50 to 99%, based on (a), (c) and (e) above.

The taxon has probably suffered a substantial decline in range and abundance from widespread clearing, habitat destruction and degradation across much of its range.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 60 to 100 years is projected to be 60 to 90%, based on (c) and (e) above.

Future decline is based on the effects of the identified threats, including disturbance, weed invasion and drying conditions due to decreasing rainfall that variably affect the remaining occurrences.

Eligible under Criterion A4 as Critically 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 60 to 99%, based on (a), (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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

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

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 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 and is estimated to have 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 Endangered

It is estimated that there are 210 to 550 mature individuals, based on sporadic surveys and VBA records.

There is estimated to be a continuing decline of 30 to 60% within two generations.

Eligible under Criterion C2 as Endangered

It is estimated that there are 210 to 550 mature individuals, there is an estimated continuing decline and the percentage of mature individuals in one subpopulation is 95 to 100%.

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 210 to 550 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.

Jeanes, J. A. (2004). A revision of the *Thelymitra pauciflora* R.Br. (Orchidaceae) complex in Australia. *Muelleria, 19,* 19-79.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Thelymitra bracteata*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/07d0a19e-8333-4d0d-afc2-d24ba968430d