Threatened Species Assessment

Thelymitra alpicola
Alpine Sun-orchid

Taxonomy

Thelymitra alpicola Jeanes

The buds and finished flowers are very similar to and difficult to identify from the *Thelymitra simulata* and *Thelymitra ioxioides* with which it grows, so it cannot reliably be identified when not in flower (Backhouse et al., 2016).

Thelymitra alpicola can be distinguished from *T. incurva* by its deep purplish blue, strongly striated perianth and more or less parallel (sometimes incurved at apices), often narrow, shallowly erose, lateral lobes on the column. The two species also frequent different habitats (VicFlora 2018).

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+4ace; B1ab(v); C1

Species Information

Description and Life History

The taxon is a flowering stem erect, straight, 15-50 cm tall, 1-3.7 mm diam., straw-coloured to purplish. Leaf linear to linear-lanceolate, attenuate, 6-25 cm long, 4-13 mm wide, fleshy to leathery, canaliculate to conduplicate, ribbed abaxially, sheathing at base, dark green with a purplish base. Inflorescence 1-6-flowered, open. Sterile bracts usually 2, rarely 1 or 3. Perianth segments lanceolate to ovate, 8-14(-16) mm long, deep purplish blue with darker longitudinal striations, opening freely on warm days. Column slender, 4.6-6.5 mm long, purplish; mid-lobe slightly hooding the anther, often bilobed, margin irregular, sometimes with a central tooth, somewhat sinuate, dorsal surface rugulose, reddish brown to almost black, apex yellow or pinkish; lateral lobes parallel or weakly incurved at apices, 1-2.2 mm long, fleshy, obliquely erect or porrect, pink or brownish at base, faces smooth, margins often shallowly and irregularly erose, apex cream to yellow. Anther inserted towards apex of column, with a prominent entire or emarginate beak. The taxon flowers late October to January. This taxon is facultatively autogamous. Most flowers usually have pollen grains on the stigma even before they open (VicFlora 2018).

The Mirboo North population flowers in early December, while alpine plants flower from late December to early January. It is often not seen in flower, as it seems to have a very short flowering season, with alpine plants in peak flower around the Christmas-New Year period, while the lowland plants flower about three weeks earlier. The taxon is tardily opening at the best of times and, once open, will quickly close if the weather cools. During protracted periods of poor weather in the mountains, flowers may not open at all in some years (Backhouse *et al.,* 2016).

Generation Length

The generation length of *Thelymitra alpicola* 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, 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 reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is confined mostly to the mountains of far eastern Victoria near the NSW border, at 850-1,500 metres altitude. Most populations occur within the Alpine National Park. The taxon also occurs at a single site near Mirboo North in the Strzelecki Ranges in South Gippsland, at an altitude of 170 metres above sea level. This highly disjunct population is intriguing, as it is a long way from (and at a much lower altitude than) the bulk of the taxon's range in the mountains further east (Backhouse *et al.* 2016). The taxon also occurs in New South Wales.

Habitat

The taxon grows in alpine and montane heathlands, in moist areas around the edges of sphagnum bogs, beside streams or in soaks and swamps. The soils are generally dark sandy, clayey, or peaty loams (Jeanes 2012; VicFlora 2018). Backhouse *et al*. (2016) noted that it grows in damp sites along seepage lines on the sloping edges of alpine meadows or hillsides in open Snow Gum (*Eucalyptus pauciflora*) woodland, less commonly around the edges of sphagnum bogs on the plains, on black peaty soils. The Mirboo North population grows in woodland with a ground layer of grasses and sedges on clay loam soils ().

Threats

Most populations occur within the Alpine National Park, but its habitat has been severely damaged by cattle and feral horse trampling and grazing (Backhouse *et al*. 2016).

There is a high likelihood of ongoing decline in distribution and abundance due to feral horse damage to habitat, and to long-term decline and loss of habitat from increasingly dry conditions due to declining rainfall and possibly increased bushfire frequency and intensity (attendant increased bushfire risk). The localities have wide geographic, altitudinal, and climatic differences, and the operation of largely separate threats at each location/subpopulation. Plant numbers have declined substantially in the Cobberas region and at Darlimurla. Specifically. the very small Darlimurla subpopulation grows on a highly disturbed site that suffers from trail bike riding and weed invasion and is at very high risk of extinction. The Bendoc subpopulation is the most secure, although it is confined to a very small area.

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 Critically Endangered

The population reduction over the past 60 to 120 years is inferred to be 30 to 80%, based on (a), (c) and (e) above.

Past decline is based on widespread degradation. The historical loss of shallow freshwater marshes across the range of the taxon is likely to have led to the loss of many subpopulations. The taxon's alpine habitat has been heavily damaged by cattle and feral horse grazing and trampling.

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 inferred to be 50 to 70%, based on (c) and (e) above.

Future decline is based on high levels of disturbance from feral horses (Cobberas subpopulation), trail bikes and weeds (Darlimurla subpopulation), the decline and the loss of shallow freshwater marshes from increasingly dry conditions due to declining rainfall and attendant increased bushfire risk.

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 50 to 70%, 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 EoO across the taxon's range is estimated to be 74 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 a continuing decline in (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 Critically Endangered

It is estimated that there are 150 to 400 mature individuals, based on sporadic surveys and VBA records. There is an estimated continuing decline of 10-30% within one generation.

Eligible under Criterion C2 as Endangered

It is estimated that there are 150 to 400 mature individuals. 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

It is estimated that there are 150 to 400 mature individuals.

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

References

Backhouse, G. and Cameron, D. (2005). Application of IUCN 2001 Red List Categories in Determining the Conservation Status of Native Orchids of Victoria, Australia. *Selbyana* 26(1,2): 58-74.

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

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Jeanes, J. A. (2012). Two new rare species in the *Thelymitra venosa* complex (Orchidaceae) from south-eastern mainland Australia. *Muelleria, 31*(1), 8-22.

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