Threatened Species Assessment

Thelymitra orientalis
Hoary Sun-orchid

Taxonomy

Thelymitra orientalis R.J. Bates

The taxon was previously well-known as *Thelymitra mucida*. Most records of *T.orientalis/mucida* from western Victoria have since be reassigned to *Thelymitra inflata* or *Thelymitra lucida.*

In 2010, South Australian orchid taxonomist Robert Bates renamed some eastern populations of *T. mucida* as the new species *T. orientalis. T. orientalis* is generally smaller and shorter than *T. mucida*, often has only a single flower, the post-anther lobe is not as deeply notched but is more inflated than in *T. mucida*, and has paler hair tufts. Bates also considered that 'true' *T. mucida* was probably restricted to Western Australia (Backhouse et al. 2016).

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; C1

Species Information

Description and Life History

Flowering stem erect, wiry, straight, 7-10 cm tall, c. 1 mm diam., green to purplish. Leaf filiform, terete, 3-5 cm long, 1-2 mm wide, obscurely canaliculate, sheathing at base, green with a purplish base. Inflorescence 1(-2)-flowered. Sterile bracts 2. Perianth segments lanceolate to ovate, 5-7 mm long, deep blue with reddish tones. Column slender, 3-4 mm long, purplish, mid-lobe expanded into hood over the anther, tubular, inflated, narrow at the base, widening abruptly towards the apex, curved, purplish brown, with little or no hoary bloom, apex deeply v-notched, yellow; lateral lobes converging or more or less parallel, 1-2 mm long, digitiform or laterally compressed, porrect or obliquely erect, each with a sparse shaggy toothbrush-like arrangement of cream or yellow hairs embracing the mid-lobe. Anther inserted towards middle of column, shortly beaked. The taxon flowers from October to November. The flowers are self-pollinating and only open on warm, humid days. T. *orientalis* is similar to *T. mucida*, but the latter is a generally more robust plant with a larger leaf, up to 6 flowers and copious bloom on the mid-lobe of the column (VicFlora 2018).

Plants often grow submerged for several months, but usually flower in drying mud rather than in standing water. Flowering appears to be enhanced by bushfires during the previous summer (Backhouse et al. 2016).

Generation Length

The generation length of *Thelymitra orientalis* is suspected to be 10 to 40 (midpoint 25) 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 reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is very rare, it is widely but sporadically distributed across southern Victoria west from Wilsons Promontory, mostly near the coast but occurring inland to the Grampians in the west. The populations contain very low numbers of plants. The altitude ranges from 10-50 metres above sea level. The taxon also occurs in Western Australia, South Australia and Tasmania (Backhouse et al. 2016).

Habitat

The taxon grows in heath and heathy woodland, generally in damp areas and seepage areas along watercourses and around swamp margins, on heavy black often peaty soils (Backhouse et al. 2016; Bates 2010; VicFlora 2018).

Threats

There is likely to be ongoing reduction in area, extent and quality of habitat by weed invasion and disturbance (Crib Point subpopulation), and increasingly dry conditions due to decreasing rainfall (all subpopulations), leading to decline in plant numbers and loss of subpopulations and locations. At least 3 very small subpopulations are at risk of extinction. Small populations are vulnerable to rapid 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:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 30 to 120 years is estimated to be 50 to 95%, based on (a,) (c) and (e) above.

There has likely been a substantial decline due to historical habitat loss through extensive draining of shallow freshwater marshes. 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 20 to 100 years is projected to be 45 to 75% (midpoint 75%), based on (c) and (e) above.

There is likely to be ongoing reduction in area, extent and quality of habitat due to weed invasion and disturbance, and increasingly dry conditions due to decreasing rainfall. Furthermore, such small populations are vulnerable to rapid decline and extinction from stochastic events.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 20 to 120 year period, including both past and future (up to 100 years in the future), is inferred to be 50 to 95%, 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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 1,351 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

Across the taxon's linear range, four locations have been determined, based on geographic separation, local geography, habitat conditions, and threats:

- Wilsons Promontory and French Island are deemed as 1 location based on similar habitat and protection;
- Crib Point is deemed a second, separate location based on very poor habitat condition and protection and very high level of threat;
- the Anglesea and Irriwillipe localities are deemed a third location based on geography and habitat; and
- the Grampians is deemed as a fourth location based on geography, habitat and distance from the other locations.

Considering the dispersal ability of the taxon, the barriers or lack of habitat separating them, the individuals can be considered to be severely fragmented.

There is a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on ongoing reduction in the area, extent and quality of habitat due to weed invasion and disturbance and increasingly dry conditions due to decreasing rainfall, and likely loss of occurrences in response to these threats.

The Area of Occupancy (AoO) is estimated to be 24 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is estimated to be severely fragmented, has 4 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v).

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 53 to 165 mature individuals. based on sporadic surveys and VBA records.

There is an estimated continuing decline of 15 to 32% within one generation.

Eligible under Criterion C2 as Endangered

The number of mature individuals is projected 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 53 to 165 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.

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