Threatened Species Assessment

Thelymitra inflata
Inflated Sun-orchid

Taxonomy

Thelymitra inflata Jeanes

The taxon is distinguished from *Thelymitra holmesii* and *Thelymitra lucida* by the thick glistening bloom on the highly inflated mid-lobe of the column (VicFlora, 2018).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion A2ce+3ce+4ce; B2ab(v); C2a(i)

Species Information

Description and Life History

The taxon has an erect flowering stem, straight, 20-40(-65) cm tall, 1.3-3 mm diam., green to purplish. Leaf linear, attenuate, 13-30 cm long, 4-10 mm wide, fleshy, canaliculate, ribbed abaxially, sheathing at base, dark green with a purplish base. Inflorescence 1-6-flowered, open. Sterile bracts usually 2. Perianth segments lanceolate to ovate, 6-13 mm long, dark blue to purplish. Column slender, 5-6 mm long, blue to pinkish; mid-lobe expanded into hood over the anther, tubular, very inflated, gently curved, pinkish brown, brown or less often blackish, grading to yellowish at the apex, covered with a waxy often glistening bloom, apex deeply split into 2 more or less parallel lobes; lateral lobes converging 1.5-2 mm long, digitiform, porrect at base, apical half projecting upwards, each with a toothbrush-like arrangement of white, cream or yellow hairs terminating in front of mid-lobe. Anther inserted towards base of column, shortly beaked. The taxon flowers from late September to early December. Flowers are self-pollinating and only open on warm, humid days. Plants may grow submerged for several months but the sites are usually drying or dry at flowering time. This taxon is facultatively autogamous (VicFlora, 2018).

Generation Length

The generation length of *Thelymitra inflata* 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

The taxon occurs in south-western Victoria, from the Grampians to the South Australian border. The altitude ranges from 30-250 metres above sea level. The taxon also occurs in South Australia and Tasmania. It is a poorly known, seemingly rare orchid that has been recorded from few sites and plants, although plants can be extremely difficult to detect in its densely sedgy and heath habitat when not in flower.

Given that it occurs in fairly dense habitat that is difficult to search, and that there are additional potentially suitable shallow freshwater marshes across the range of the taxon, it may be more widespread and abundant than current records suggest.

Habitat

The taxon grows around swamps and in moist woodlands and open forest, often in disturbed, winter-wet sites on heavy clay loam soils (Backhouse et al., 2016; Jeanes, 2004; VicFlora, 2018). There is a suggestion that 'true' *T. inflata* is restricted to drier woodland habitats and that the swamp-growing form is an undescribed species (Backhouse et al., 2016; VicFlora, 2018).

Threats

There is little direct evidence of any previous decline in range and abundance. However, the taxon grows in seasonally damp habitats, such as around the margins of shallow freshwater marshes, and there has been a widespread historical loss of this habitat across the range of the taxon, which is likely to have led to the loss of subpopulations.

There is the possibility of a future decline in distribution and abundance, based on the likely long-term decline and loss of shallow freshwater marshes from increasingly dry conditions due to declining rainfall. At least one subpopulation (Kentbruk) is tiny, with only a few plants and grows in a very tenuous situation in a weedy roadside drain and is unlikely to survive. 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 estimated to be 30 to 95% (midpoint 60%), based on (c) and (e) above.

Past decline is based on a historical loss of shallow freshwater marshes across the range of the taxon, which is likely to have lead to the loss of subpopulations.

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 35 to 90% (midpoint 60%), based on (c) and (e) above.

Future decline is based on the likely long-term decline and loss of shallow freshwater marshes from increasingly dry conditions due to declining rainfall.

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 35 to 90% (midpoint 60%), 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 Area of Occupancy (AoO) is estimated to be 28 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

Any two of (a), (b) or (c) above are also satisfied.

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 150 to 450 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 pone subpopulation is fewer than 250.

Continuing decline is based on the current and projected impact of the identified threats.

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 450 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. (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 inflata.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/79642f99-5461-4dfb-a69e-91d869e9686a