Threatened Species Assessment

Thelymitra hiemalis
Winter Sun-orchid

Taxonomy

Thelymitra hiemalis D.L. Jones & M.A. Clem.

Thelymitra hiemalis was once known as *Thelymitra ixiodes* var. *subdifformis* (Duncan and Coates, 2010).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1998).

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

Proposed conservation status

Critically Endangered in Victoria

Criterion C2a(i); D

Species Information

Description and Life History

The taxon is a flowering stem erect, curved or straight, 20-35 cm tall, 2-5 mm diam., mostly straw-coloured to green, reddish basally. Leaf linear-lanceolate, 12-20 cm long, 8-12 mm wide, fleshy, canaliculate, dark green, often reddish at base. Inflorescence 1-5-flowered, loose. Sterile bracts 2, leaf-like. Fertile bracts usually large and leaf-like. Perianth segments oblong to lanceolate, sharply pointed, 15-22 mm long, sepals often greenish, petals and labellum mauve or blue, with large irregular darker spots. Column 4-5 mm long, white or pinkish, often with a brownish subterminal band; mid-lobe not hooded, dorsal surface with a central patch of crowded fingerlike vertical calli, yellow or orange; accessory-lobes incurved over anther, columnar, protruding beyond the mid-lobe, oblique or flat-topped, yellow to orange; lateral lobes present or absent, 0-1.5 mm long, extending horizontally or oblique, flattish, ending in a more or less globose white hair-tuft. Anther protruding below or between column-arms, shortly beaked. Flowering can occur from March to October, although most records have been between June and August. This taxon is unique within the genus *Theymitra* by the flowers which open freely in cold wet weather (VicFlora, 2014).

Little is known of the biology or ecology of *T. hiemalis*. It has only ever been recorded from very few sites and plants, and on the rare occasions it has been seen in the field, it is often just a single plant. Fire or other disturbance such as slashing is highly likely to promote flowering in *T. hiemalis* (DSE, 2003; Duncan and Coates, 2010).

Generation Length

The generation length of *T. hiemalis* 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 (OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is endemic in Victoria. It has a wide but apparently sporadic distribution in south-western Victoria, where it occurs in Mount Richmond National Park, Angahook-Lorne State Park, Portland (private property), Lower Glenelg National Park, Bats Ridge Flora and Fauna Reserve, and Aireys Inlet (private property). There are historical records from the south-east of Melbourne and from Port Campbell, which may indicate a decline in distribution and abundance of the species (Duncan and Coates, 2010; VicFlora, 2018). It seems to have always been a naturally rare plant.

Habitat

The taxon occurs in *Eucalyptus baxteri* or *Eucalyptus willisii* woodland with an understorey typically dominated by heath species such as *Xanthorrhoea australis*, *Leptospermum myrsinoides, Leptospermum continentale, Acacia oxycedrus, Banksia marginata* or *Pteridium esculentum* on well-drained, dark grey loamy sand. The critical habitat has not yet been determined (DSE, 2003; Duncan and Coates, 2010; VicFlora, 2018).

Threats

There is some evidence of a previous decline in distribution and abundance, with the historic loss of subpopulations around Portland and Melbourne, most likely from loss and degradation of habitat through clearing, weed invasion, disturbance and grazing.

Threats to the taxon include weed invasion (various sites will be at risk of Monterey Pine or Coast Wattle invasion without management), grazing (stock grazing on private land); disturbance/destruction (various sites are at risk of accidental destruction caused by track maintenance activities and all populations are highly vulnerable to damage from trampling); and inappropriate fire regimes (sites are long unburnt - the taxon is known to flower after fire) (DSE, 2003; Duncan and Coates, 2010).

Most remaining habitat is protected in reserves but may also be at risk through increasingly dry conditions from reducing rainfall and consequent increase in intensity and severity of bushfires, possibly leading to decline and loss of subpopulations. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame. It is likely that the conditions for maintenance of the pollinator and/or mycorrhizal fungi have been adversely affected at some sites.

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 inferred to be 30 to 85% (midpoint 60%), based on (a) and (c) above.

Past decline is based on historic loss of subpopulations and habitat.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 60 to 100 years is suspected to be 10 to 50%), based on (c) and (e) above.

Future decline in population size is based on the impacts of the identified threats.

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 inferred to be 30 to 65%, 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 36 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, considering the barriers to dispersal, or lack of habitat separating them.

It is estimated to have 4 locations. It has a continuing decline in (v) above, based on the impacts 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 C2 as Critically Endangered

It is estimated that there are 10 to 50 mature individuals, based on sporadic surveys and VBA records. All subpopulations have very low numbers of flowering plants, with some subpopulations not flowering in some year.

There is an inferred continuing decline, and the number of mature individuals in one subpopulation is fewer than 50.

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 Critically Endangered

The taxon is estimated to have 10 to 50 mature individuals.

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

References

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