Threatened Species Assessment

Thelymitra circumsepta
Naked Sun-orchid

Taxonomy

Thelymitra circumsepta Fitzg.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2ace+4c; B2ab(iii)

T. circumsepta is believed to have 70% of its 20 Victorian sites occurring within the footprints of the 2019/20 bushfires. The taxon is believed to be generally fire tolerant (although peat fire could be devastating) even in the context of these fires, but it is considered to be at some risk of post-fire impacts.

Species Information

Description and Life History

The taxon is a seasonal terrestrial deciduous orchid growing to 70 cm tall, with up to 10 small flowers to 30 mm across, lilac to pale blue with a white to pink column with a yellow to orange apex and yellowish hair tufts. Sepals and petals to 15 mm long, ovate, labellum very similar, narrowly ovate, column with dense untidy hair tufts on lateral lobes, erect and toothed auxiliary lobes and a thin, triangular post-anther lobe. Flowers open widely on warm humid days but close at night and remain closed or only partially open in cool weather. Grows in swamps, along streams and in damp areas in heathy and heathy woodland and open forest, often on acid peaty soils. Plants emerge in autumn or spring, depending upon altitude, and commence flowering in late November and flower over summer. Pollinated by native bees through food deception, the bees attempting to collect pollen from the column (VicFlora 2018).

Generation Length

The generation length of *Thelymitra circumsepta* is estimated to be 20 to 40 years (midpoint 30 years). This is based on generation time for non-colonial terrestrial orchids estimated to be a nominal 30 years based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, individuals are 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 widely but very sporadically distributed across southern Victoria, from Chapple Vale in the Otway Ranges to Genoa in far east Gippsland, extending well into the alpine region to Mt Cobberas. Its altitude range is 10-1,500 metres above sea level.

The taxon also occurs in South Australia, Tasmania, and New South Wales.

Habitat

The taxon grows in heathy woodland on yellow to grey sandy loam and light clay loam, and sometimes gravelly soils (Backhouse et al. 2016).

Threats

The taxon is currently threatened due to habitat damage from feral deer such as Sambar Deer (*Rusa unicolor*) and Red Deer (Cervus elaphus), land clearing and agricultural intensification, forestry activities, fire management activities, and declining habitat conditions due to increased climatic drying from reducing rainfall. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.
Some subpopulations may be susceptible to weed invasion, particularly Blackberry (*Rubus fruticosus*).
The taxon and its habitat have been impacted by the bushfires of 2019/2020. Despite the taxon being considered generally fire tolerant, under extreme fire conditions peaty soils have the potential to smoulder and kill underground plant structures. In addition to direct fire damage, the taxon is considered to be at some risk of post-fire impacts.
The taxon's recovery depends on effective control of the impacts of feral herbivores and prevention of major soil and vegetation disturbance as a result of fire recovery activities.

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 65%, based on (a), (c) and (e) above.

Past reduction is based on the wide distribution of subpopulations, and the extensive loss of, and decline in, wetland habitat across this distribution. However, only a single subpopulation that once occurred at Rosebud on the Mornington Peninsula is known to have become extinct due to habitat loss. Substantial habitat still occurs in the East Gippsland subpopulation region but much of this was burnt in the 2019/20 fires. It is not known if any peat substrate was burnt.

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

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 suspected to be 30 to 55%, based on (c) 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 140 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented as it is known from at least 7 subpopulations occurring in 5 locations. Six subpopulations are very isolated by loss of habitat and could be considered severely fragmented, because of its limited dispersal ability and isolation and lack of habitat between subpopulations, with a reduced probability of recolonisation should subpopulations become extinct, resulting in an increased extinction risk to the taxon. The East Gippsland subpopulation occurs in an area of extensive forested habitat and additional records of plants could be expected in this region.

It has a continuing decline in (iii) above based on the impacts of the identified threats, such as damage from feral deer, land clearing, forestry, fire management activities, and climatic drying.

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 Vulnerable

It is estimated that there are 1,600 to 4,700 mature individuals, and there is projected to be a continuing decline of 20 to 30% within three generations.

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 Vulnerable

The taxon is estimated to be very restricted.

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.

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