



## *Thelymitra incurva* Swamp Sun-orchid

### Taxonomy

*Thelymitra incurva* Jeanes ined.

*Thelymitra incurva* can be distinguished from *T. alpicola* by its plain, pale blue (rarely pink) flowers and strongly incurved, broad, often concave, shallowly erose lateral lobes on the column. The two taxa also frequent different habitats (VicFlora, 2018).

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2013).

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

### Proposed conservation status

Critically Endangered in Victoria

Criteria B1ab(iii,v)+2ab(iii,v); C2a(i)

### Species Information

#### Description and Life History

The taxon is a flowering stem erect, straight, 20-65 cm tall, 1.2-3 mm diam., straw-coloured to purplish. Leaf linear to linear-lanceolate, attenuate, 10-20 cm long, 4-9 mm wide, fleshy to leathery, canaliculate to conduplicate, ribbed abaxially, sheathing at base, dark green with a purplish base. Inflorescence 1-7-flowered, open. Sterile bracts usually 2, rarely 1 or 3. Perianth segments lanceolate to ovate, 7-12 mm long, pale blue, rarely pink, opening freely on warm days. Column slender, 4-5.5 mm long, pale blue; mid-lobe slightly hooding the anther, often bilobed, margin thickened, irregular, sometimes with a central tooth, somewhat sinuate, dorsal surface rugulose, reddish brown to almost black, apex yellow or pinkish; lateral lobes usually strongly incurved throughout, 1.5-2 mm long, fleshy, often concave, obliquely erect or porrect, pink or brownish at base, faces smooth, margins often shallowly and irregularly erose, apices often touching below tip of anther beak, cream to yellow. Anther inserted towards apex of column, with a prominent entire or emarginate beak. The taxon flowers in late October and November (VicFlora. 2018). It is one of the last sun-orchids to flower on the coastal plains of East Gippsland, coming into flower when the other species with which it grows, have pretty much finished flowering (Backhouse et al., 2016).

It is known from only a few sites and generally low numbers of plants, although the taxon is most prolific in the year or two following a summer fire. As the vegetation regenerates and becomes much dense in the years following fire, numbers of flowering plants decline, although a few plants can usually be seen in most years.

#### Generation Length

The generation length of *Thelymitra incurva* 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.

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## Distribution

The taxon is endemic to Victoria, where it is apparently confined to the lowland of East Gippsland east from Marlo, mainly east of Cape Conran. The altitude ranges from 40-250 metres above sea level. It may well occur at other sites within its range, much of which is poorly accessible.

## Habitat

The taxon grows in moist heathlands and heathy woodlands mostly around the edges of Spear Grass-tree (*Xanthorrhoea resinifera*) plains, often in disturbed sites such as roadsides and gravel scrapes. Soils are moist coarse sandy, peaty loams (Backhouse et al., 2016; VicFlora, 2018).

## Threats

There has been an apparent decline in one subpopulation (Wingan River), from collection and disturbance, and plants have not been seen there in recent years.

There is the possibility of a future decline in distribution and abundance, based on the possible long-term decline and loss of seasonally damp, swampy habitats from increasingly dry conditions due to declining rainfall and attendant increase in frequency and intensity of bushfires. 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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> <p>based on any of the following:</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

## Evidence:

### Eligible under Criterion A2 as Endangered

The population reduction over the past 60 to 120 years is inferred to be 15 to 50%, based on (a) and (d) above.

There has been a reduction in the number of plants at the Wingan River subpopulation, apparently from collection and disturbance.

### Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is suspected to be 15 to 50%, based on (c) above.

Future decline is based on the likely long-term decline and loss of seasonally damp, swampy habitats from increasingly dry conditions due to declining rainfall and possibly attendant increase in frequency and intensity of bushfires.

### 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 15 to 50%, based on (a), (c) and (d) above.

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 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is deemed to occur in a single location due to occurring in similar habitat, a similar condition and with similar threats.

It has a continuing decline in (iii) and (v) above, based on the likely long-term decline and loss of shallow swampy habitats from increasingly dry conditions due to declining rainfall.

#### Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 1 location and has a continuing decline in (iii) and (v) above.

# Thelymitra incurva Swamp Sun-orchid

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 20 to 100 mature individuals in 2 subpopulations, 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 each subpopulation is fewer than 50.

Criterion D. Very small or restricted populations				
		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 km <sup>2</sup> or number of locations ≤ 5

## Evidence:

### Eligible under Criterion D as Endangered

The taxon is estimated to have 20 to 100 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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