# Threatened Species Assessment

## *Thelymitra malvina*
## Mauve-tuft Sun-orchid

### Taxonomy

*Thelymitra malvina* M.A. Clem., D.L. Jones & Molloy

*Thelymitra malvina* has been confused with *T. atronitida*, but the latter usually has 2 sterile bracts, slightly smaller flowers, glossy black mid-lobe with a yellow apex and white hair tufts on the lateral lobes 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

Criteria A2bc; B2ab(i,ii,iii,v)

### Species Information

#### Description and Life History

The taxon has an erect flowering stem, straight, 25-75 cm tall, 1.5-5 mm diam., green to purplish. Leaf linear to linear-lanceolate, attenuate, 10-35 cm long, 5-20 mm wide, leathery, canaliculate, ribbed abaxially, sheathing at base, dark green with a purplish base. Inflorescence 3-25-flowered, usually loose. Sterile bracts usually 3, rarely 2. Perianth segments lanceolate, elliptic or ovate, 8-16 mm long, slate blue to mauve. Column thick, 6-7.5 mm long, white to blue or mauve; mid-lobe hooding the anther, tubular, inflated, dorsally compressed towards apex, gently curved through 90 deg., mostly dark reddish brown, apex emarginate, yellow, apical orifice small; lateral lobes converging 1-1.5 mm long, digitiform, porrect at base then curved upwards near the middle, each with a sub-terminal mop-like tuft of pink or mauve (rarely white) hairs embracing the mid-lobe. Anther inserted near middle of column, shortly beaked (VicFlora, 2018).

The taxon flowers in October and November. Although the flowers open fairly readily on warm humid days, they usually close by midday, even if the afternoon temperature gets warmer. Towards the end of the flowering season some plants will open on cooler days than is usual for the species, with flowers still open in the early afternoon. Summer bushfires appear to stimulate flowering the following spring, with plants growing up in burnt areas often taller and more robust with higher flower counts than is usual (Backhouse et al., 2016).

#### Generation Length

The generation length of *Thelymitra malvina* 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 widely but sporadically distributed right across southern Victoria, from Nelson to Mallacoota. The altitude ranges from 10-250 metres ASL. The taxon also occurs in SA, Tas, NSW, Qld (also New Zealand) (Backhouse et al., 2016).

### Habitat

The taxon grows in tall open forest, heathy woodlands and coastal scrublands on dry sandy or clay loam soils, and around the margins of heathy swamps on damp black peaty soils, where they sometimes grow in standing water (Backhouse et al., 2016).

### Threats

Sites particularly in the Melbourne region has been lost to development. Specifically, one site of around 30 plants was lost in the 1980s at Rosebud. Habitat loss and degradation remains a threat for most populations outside the East Gippsland region where, until the wildfires of 2019/2020, the taxon was fairly well-conserved. Occurrences in damp sites, such as swamp margins, are likely to be affected by climate change-induced drying and warming.

The bushfires of 2019/2020 are believed to have impacted around 25% of the taxon's modelled habitat. The overall impacts of the fire are yet to be determined. The taxon is likely to be threatened by feral herbivores, notably Sambar Deer and soil and vegetation disturbance as a result of fire recovery activities. Drought, hot weather and repeat fires have the potential to damage or destroy recovering plants and/or seedlings. In addition, under extreme fire conditions, peaty soils have the potential to smoulder and kill underground plant structures.

## 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 40 to 60%, based on (b) and (c) above.

Past decline is based on habitat loss and degradation, which has reduced populations outside East Gippsland.

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 25 to 30%, based on (c) and (e) above.

Populations outside the East Gippsland region are threatened by habitat loss and/or degradation. The East Gippsland populations were previously considered to be well-conserved, however this area was affected by the bushfires of 2019/2020. Orchids are generally tolerant of fire, being mostly dormant through summer. The overall impacts of the fire are yet to be determined.

**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 30 to 65%, based on (b), (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 68 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, considering the limited dispersal ability of the taxon, the barriers to dispersal, or lack of habitat separating them. The eastern, western and central subpopulations are highly disjunct.

It is estimated to have a continuing decline in (i), (ii), (iii) and (v) above, based on habitat loss and/or degradation for populations outside the East Gippsland region and the projected effects of the 2019/2020 bushfires in the East Gippsland region.

| 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 C as Vulnerable**

It is estimated that there are 3,000 to 6,000 mature individuals, based on DELWP 2018 records and observations.

There is estimated to be a continuing decline of 25 to 30% within two 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<br>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:<br>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., Kosky, B., Rouse, D., and Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia*. Melbourne, Victoria: EBook.

Clements, M.A. in Jones, D.L. (ed.) (1989), Catalogue of Australian Orchidaceae. *Australian Orchid Research* 1: 141

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014.* Department of Environment and Primary Industries, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Thelymitra malvina*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0de4b1c5-3f1f-43ea-9464-c713a12d5758