Threatened Species Assessment

Mitrasacme polymorpha
Varied Mitrewort

Taxonomy

Mitrasacme polymorpha R. Br.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a perennial herb, sometimes flowering in first year, erect, to c. 15(-30) cm high, usually much branched, hirsute or scabrous; hairs spreading to patent. Leaves narrowly ovate to oblong, oblanceolate or linear, 2-15 mm long, 1-3(-6) mm wide, glabrous or sparsely to moderately hairy, margin recurved, apex acute. Inflorescence to c. 10 cm long, flowers arranged in terminal, irregular umbels of 3-6 flowers; pedicels to 40(-75) mm long, glabrous. Calyx 2-4 mm long, lobes about equal to tube; corolla 6-8.5 mm long, lobes 2.5-4 mm long. Capsules globular, 3-4 mm diam., with fruiting style 1-2 mm long. The taxon flowers and fruits September to April (VicFlora 2018).

The taxon is a short-lived perennial herb killed by fire but with a persistent soil-stored seedbank (Keith & Tozer 2012).).

Generation Length

The generation length of *Mitrasacme polymorpha* is estimated to be 15 to 70 (interval 25) years. Keith & Tozer (2012) mention that the taxon lives for less than 5 years and that it is a short-lived perennial herb killed by fire but with a persistent soil-stored seedbank. The taxon can flower in the first year following germination (VicFlora 2018). It is likely to recruit episodically following intense fire events at pre-European settlement intervals of 25-70 years, supplemented by opportunistic recruitment in response to localised site disturbance events such as animal digging..

Distribution

The taxon is restricted in Victoria, but locally common in far East Gippsland (Mallacoota area), apparently also at Wilsons Promontory, but has not been recorded from there since 1908. The taxon is reliably recorded between Lake Tyers and the New South Wales border, extending inland only as far as Club Terrace (where last collected in 1903) and the Genoa district. It also occurs in Queensland and New South Wales (VicFlora 2018).

Habitat

The taxon is locally common in near-coastal heaths (VicFlora 2018) and heathy open forest. Quadrat data suggests the taxon is often associated with seasonally waterlogged peaty wet heaths or Grass-tree Plains dominated by *Xanthorrhoea resinosa* (Spear Grass-tree).

Threats

Historic decline through habitat loss to agriculture is likely to have been relatively minor, since most records are for continuous stands of native vegetation within conservation reserves or state forest. Key current and future threats are climatic warming and drying resulting in an increasing risk of recruitment failure, seedbank depletion and local extinction. Increasing frequency and intensity of fire as a consequence of climate change and fuel reduction burning threaten occurrences in wet peaty heathlands or Grass-tree Plains dominated by Spear Grass-tree, since these organic substrates can be consumed by peat fires. Biotic threats also include excavation of damp soils by feral pigs, casual or targeted browsing and trampling by feral deer, notably by Sambar or Hog Deer.

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 A3 as Endangered

The population reduction over the next 45 to 100 years is projected to be 25 to 75% (midpoint 45%), based on (c) and (e) above.

An estimate of future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 45 to 210 year period, including both past and future (up to 100 years in the future), is inferred to be 30 to 75% (midpoint 50%, based on (c) and (e) above.

Historic decline through habitat loss to agriculture is likely to have been relatively minor since most records are for continuous stands of native vegetation within conservation reserves or state forest. An estimate of future decline is based on the projected impact of the identified threats.

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 B1 as Endangered

The Extent of Occurrence is estimated to be 2,886 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is severely fragmented naturally at the landscape scale. At the time of European settlement the taxon was also severely fragmented at the regional scale although it is likely to have become locally extinct at Wilsons Promontory where it was last recorded in 1908. The only plausible vectors are ants (myrmecochory) which operate at the metre scale.

Two locations can be identified based on habitat: one for all occurrences on sandy or loamy profiles subject to generic identified threats and one for occurrences in peaty heaths or Grass-tree Plains also subject to the risk of incineration of the organic substrate.

It has a continuing decline in (i), (ii), (iii), (iv) and (v0 above, based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) is estimated to be 156 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the (VBA). As above, it is severely fragmented, has two locations and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals. No estimates of the number of mature individuals present at sites of occurrence have been given with records of the taxon in Victoria. It would also be difficult to estimate the number of individuals at sites as they are small and can blend in with surrounding vegetation.

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 D2 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

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

https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

Keith, D.A. and Tozer, M.G. (2012). Vegetation dynamics in coastal heathlands of the Sydney Basin. *Proceedings of the Linnean Society of New South Wales* 134: B181-B197.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: Mitrasacme polymorpha. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/07fc7491-a5d1-4142-a524-575dfe58a8c3