Threatened Species Assessment

Stenopetalum velutinum
Velvet Thread-petal

Taxonomy

Stenopetalum velutinum F. Muell.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria B1ab(iii,v)c(iv)+2ab(iii,v)c(iv); C2a(i)b; D

Species Information

Description and Life History

The taxon is an annual herb or woody at base, to 65 cm high, densely covered with appressed, irregularly branched hairs. Basal leaves lanceolate, to 7 cm long, entire or with a few teeth; stem leaves lanceolate to linear, to 7 cm long. Sepals 3-5 mm long; petals 6-20 mm long, yellow-green to brown, claw linear, lamina elliptic with long slender apex. Fruit subglobose to oblong or obovoid, 5-8 mm long, 3-4 mm wide; pedicels appressed, erect or slightly spreading, 2-10 mm long. The taxon flowers in spring (VicFlora 2019).

Generation Length

The generation length of *Stenopetalum velutinum* is estimated to be 1 to 25 years. The average fire interval in the Big Desert area where this taxon occurs is around 20 years (Wellington and Noble 1985). In good seasons, the taxon recruits from the soil seed bank. It is not fire-cued but has been observed revegetating post-fire. Cheal (2010) noted that although the taxon has taken advantage of the opportunities presented by the 2002 bushfires, it is probably not an obligate fire ephemeral. The other two congeners that occur in Victoria, *S. lineare* (Narrow Thread-petal) and *S. sphaerocarpum* (Pea Thread-petal) are also annual and occur in burnt and long unburnt habitats. The recruitment of other north-western Victorian crucifers is in response to disturbance, and none are obligate fire ephemerals (Cheal 2010).

Distribution

The taxon is known from a few nineteenth century collections in the Wimmera region but is now apparently very rare in Victoria. Recent records are known only from a 1981 collection at Bruce's Bend in Mildura and a 2003 report from the Big Desert (Cheal 2010). Only 12 plants were found in the Big Desert.

According to PlantNet, the taxon is presumed to be extinct in New South Wales. However, there is a 1993 collection from Caradoc Station 25 km north of White Cliffs and a 2003 collection from Woodsreef, near Barraba. There are also recent collections from the Northern Territory and South Australia.

Habitat

In Victoria, the taxon has been reported growing in a recently burnt mallee flat dominated by *Eucalyptus dumosa* (Dumosa Mallee) and *E. leptophylla* (Slender-leaf Mallee), on infertile, aeolian, Lowan sands. Cunningham *et al.* (1981) noted that in western New South Whales the taxon is uncommon. Known habitats include red earth soils in

Eucalyptus populnea (Poplar Box) and *Callitris glaucophylla* (White Cypress-pine) communities. The taxon apparently rarely occurs as more than scattered plants or very small stands.

Threats

The most likely threats to the taxon are increased drying and warming, reduced rainfall and increased drought stress as a result of climate change. The most serious threat is the lack of favourable rainfall after a fire event, leading to recruitment failure due to drought stress.

Cheal (2010) suggested that the taxon is highly palatable and was eliminated from most of its former Victorian range by introduced livestock and rabbits soon after European settlement. Cheal (2010) also suggested that a lack of contemporary seed sources and grazing by rabbits and kangaroos may be responsible for its contemporary rarity. The persistence of the taxon may possibly be attributed to the lack of grazing pressure from rabbits, goats or kangaroos. None of the plants in the Big Desert showed any evidence of having been grazed.

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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Area of Occupancy (AoO) to ensure consistency with the definition of the AoO as an area within EoO.

The taxon is severely fragmented considering its limited dispersal ability, the barriers to dispersal, and lack of habitat separating individuals.

It is estimated to have 2 locations, and has a continuing decline in (iii) and (v) above, based on occurrence in remnant stands across alienated landscapes, and the impacts of rabbits and weed invasion.

It has extreme fluctuation in population size according to seasons. It is probably not an obligate fire ephemeral, and the other two congeners that occur in Victoria, S. *lineare* and *S. sphaerocarpum,* are also annual, and occur in burnt and long unburnt habitats.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 2 locations, and has a continuing decline in (iii) and (v) and extreme fluctuations in (iv) 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:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 12 to 24 mature individuals. The number of mature individuals that is provided here is based on Cheal (2010). The collector of the specimen from Bruce's Bend made no comment about population size, and the taxon rarely occurs as more than scattered plants or in very small groups (Cunningham *et al*. 1981).

The number of mature individuals is inferred to continue to decline. The number of mature individuals in each subpopulation is fewer than 50, and there are extreme fluctuations in the number of mature individuals

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 12 to 24 mature individuals.

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

References

Cheal, D. (2010). Velvet Thread-petal *Stenopetalum velutinum* rediscovery in Australia. *The Victorian Naturalist* 127 (1):19-22.

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. (1981). *Plants of western New South Wales*. Soil Conservation Service of NSW.

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

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Stenopetalum velutinum*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0c6eb910-362f-46ad-8029-b5572be6000a

Wellington, A.B. and Noble, I.R. (1985). Post-fire recruitment and mortality in a population of the mallee *Eucalyptus incrassata* in semi-arid, south-eastern Australia. *Journal of Ecology* 73: 645-656.