

Petalophyllum preissii Petalwort

Taxonomy

Petalophyllum preissii Lehm.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ac+3c+4c; B1ab(ii,iv,v)+2ab(ii,iv,v)

It is possible that both subpopulations have become extinct since last surveyed.

Species Information

Description and Life History

Petalwort is a thallose liverwort with a leafy rosette appearance, resembling a minute lettuce. Capsules form in a bulbous involucre in the centre of the rosette.

Generation Length

The generation length of *Petalophyllum preissii* is estimated to be 11 to 25 years based on Hallingbäck *et al.* 2000 for long-lived shuttle/perennial stayer taxa.

Distribution

The taxon is known only from a bluff overlooking the Nelson River and an old record from Mt Clay Flora Reserve. It also occurs in Western Australia, South Australia, and New Zealand where it is known from a single site.

Habitat

This taxon grows only on calcareous soil in dry habitats close to the coast, sometimes in cracks in limestone rock.

Threats

The taxon is potentially threatened by increasing dryness as a result of climate change, together with the related threat of increased fire frequency and intensity. The two subpopulations are small and isolated. The subpopulation at Jones Scenic Lookout, overlooking the Nelson River, contracted from perhaps 100 plants to only about 10 within a decade (D. Meagher, pers. obs. 1999 and 2009) and it is not known whether it is extinct there now. The other Victoria subpopulation may be extinct, as the locality (Reedy Swamp) was almost dry in 2009 and the taxon could not be found there (D. Meagher, pers. obs.). It is noteworthy that the only known New Zealand population, numbering 69 plants when discovered in 2010, had declined to 36 plants by 2019 (Perrie 2019).

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>
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Evidence:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 33 to 75 years is inferred to be 60 to 90%, based on (a) and (c) above.

Past reduction is based on the observed decline at Jones Lookout and a possible similar decline at Mt Clay.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 33 to 75 years is suspected to be 60 to 100%, based on (c) above.

Future decline is based on the observed and presumed declines of the two subpopulations, and on the impact of the current and projected threats.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 33 to 75 year period, including both past and future is inferred to be 60 to 100%, 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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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) and the Australasian Virtual Herbarium.

It is estimated to have one location. If both subpopulations still exist, they are threatened by the same threat of drying of habitat.

It has a continuing decline in (ii), (iv) and (v) above based on the current and projected identified threats, specifically increasing dryness as a result of climate change, and increased fire frequency and intensity.

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, the taxon has 1 location and has a continuing decline in (ii), (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:

Eligible under Criterion C as Endangered

It is estimated that there are 10 to 110 mature individuals. The size of the Jones Lookout subpopulation is known to have declined to about 10 individuals by 2019. The Mt Clay subpopulation is unknown but is unlikely to have numbered (and still number) more than 100 individuals, based on knowledge of other subpopulations in Australia and New Zealand.

There is an inferred continuing decline. The size of the subpopulations is unknown, but given the total population estimate of 10 to 110 mature individuals, then the number of mature individuals in each subpopulation must be fewer than 250 and could be 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 ² or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 10 to 110 mature individuals.

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
- Hallingbäck T., Hodgetts N., Raeymaekers G., Schumacker R., Sérgio C., Söderström L., Stewart N. and Váða L. (2000). Guidelines for application of the 1994 IUCN Red List categories of threats to bryophytes. Appendix 1 in Hallingbäck T. and Hodgetts N. (2000) Mosses, Liverworts and Hornworts. Status Survey and Conservation Action Plan for Bryophytes. IUCN: Gland, Switzerland.
- Perrie L. (2019). Goodbye to the lettuce liverwort. <https://blog.tepapa.govt.nz/2015/11/12/goodbye-to-the-lettuce-liverwort-its-going-extinct/>
- Scott G.A.M. (1985). *Southern Australian Liverworts*. Australian Flora and Fauna Series No. 2. AGPS: Canberra.