

Plagiochasma rupestre Cliff Waxwort

Taxonomy

Plagiochasma rupestre (J.R. Forst. & G. Forst.) Steph.

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 A3c+4c; B1ab(iii,iv,v)+2ab(iii,iv,v); C2a(i); D

Species Information

Description and Life History

P. rupestre is a thallose liverwort that grows by dichotomous division of the thallus apex. It is monoicous and reproduces by spores produced in a receptacle that is sessile initially, but then raised on a stalk. Plants might also reproduce by fragmentation.

Generation Length

The generation length of *Plagiochasma rupestre* is estimated to be 11 to 25 years. This is based on guidelines in Hallingbäck et al. (2000) for long-lived shuttle/perennial stayer taxa.

Distribution

in Victoria the taxon has been recorded from only 5 sites, in the inner west of Melbourne, the Warby Ranges, and Barfold Gorge. The Darebin subpopulation is presumed to have become extinct before the 1950s, as active bryophyte collectors from that time have not recorded it around Melbourne. It is therefore excluded from this assessment.

The taxon is circumglobal, from the tropics to cool temperate regions and is widely distributed in Australia,

Habitat

The taxon is known only from rock and soil in open, humid conditions close to flowing water, and in Victoria is currently confined to waterfalls in otherwise dry country.

Threats

The taxon requires humid conditions close to flowing water, and is therefore threatened by the drying of habitat caused by reduced water availability which is predicted to occur as a result of climate change.

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 style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (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 33 to 75 years is suspected to be 40 to 85% (midpoint 65%), based on (c) above.

The Warby Range subpopulations are extremely vulnerable because they are adjacent to small waterfalls in an area of normally low rainfall. Reduced rainfall resulting from climate change is likely to cause a decline in habitat quality. Bushfire is also a major threat in the Warby Range.

Eligible under Criterion A4 as Endangered

The population reduction over any 33 to 75 year period, including both past and future, is inferred to be 40 to 85% (midpoint 65%), based on (c) above. The causes of reduction may not have ceased, be understood or be reversible.

At least one of the Warby Ranges subpopulations (at The Gorge) might be extinct (D. Meagher, pers. obs. 1997).

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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 500 km², and the Area of Occupancy (AoO) is estimated to be 20 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, has 2 locations, and has a continuing decline in (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 <u>C1</u> or <u>C2</u>				
<u>C1</u>	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)
<u>C2</u>	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 Endangered

It is estimated that there are 160 to 320 mature individuals. This is based on the Barfold Gorge subpopulation, which is estimated to be no more than 100 plants.

The number of mature individuals is inferred to continue to decline, and the number of mature individuals in each subpopulation is fewer than 250.

Criterion D - Very small or restricted population ^a			
	Critically Endangered ^a	Endangered ^a	Vulnerable ^a
Number of mature individuals (observed or estimated) ^a	<50 ^a	<250 ^a	<1,000 ^a
D2 - Only applies to the VU category ^b 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. ^a	- ^a	- ^a	D2 - Typically: ^b AoO < 20 km ² or number of locations ≤ 5 ^a

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 160 to 320 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.
- 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. *Mosses, Liverworts and Hornworts. Status Survey and Conservation Action Plan for Bryophytes*. IUCN: Gland, Switzerland.
- Scott, G.A.M. (1985). *Southern Australian Liverworts*. Australian Flora and Fauna Series No. 2. AGPS: Canberra.