



Meesia muelleri Hump Moss

Taxonomy

Meesia muelleri Muell. Hal. et Hampe

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(ii,iii,iv,v)+2ab(ii,iii,iv,v)

Species Information

Description and Life History

M. muelleri is a dioicous perennial plant of upland wetlands, where it grows only on permanently damp or wet peaty soils.

Generation Length

The generation length of *Meesia muelleri* is estimated to be 11 to 25 years as proposed by Hallingbäck *et al.* (2000) for 'long' life taxa ('long-lived shuttles - perennial stayers') that are known to produce sporophytes.

Distribution

The taxon is endemic to the Australian Alps (Victoria, New South Wales, and Australian Capital Territory).

Habitat

M. muelleri grows in deep cushions in bogs and other wetland habitats, including wet grasslands, in alpine and subalpine areas (Scott and Stone 1976, Australasian Virtual Herbarium records).

Threats

Alpine taxa are prone to range contraction as a result of climate change. Bushfires are becoming more frequent, and two closely spaced fires would be particularly detrimental to the taxon.

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>
--	---------------------------------------	---

Evidence:

Eligible under Criterion A3 as Endangered

The population reduction over the next 33 to 75 years is projected to be 30 to 80% (midpoint 50%), based on (c) above.

As this taxon is restricted to alpine and subalpine wetlands, climate change is likely to lead to a significant loss of populations.

Eligible under Criterion A4 as Endangered

The population reduction over any 33 to 75 year period, including both past and future, is estimated to be 30 to 80% (midpoint 55%), 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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 2,421 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented based on its limited dispersal ability, the barriers to dispersal, and/or the lack of habitat separating subpopulations. Such fragmentation precludes the possibility of recolonisation in the event of local extinction.

The taxon is subject to long acting, landscape scale threats that impacts on individuals of a taxon sequentially or randomly over time. There are six discrete areas where the majority of individuals are potentially at risk of being impacted by these threats.

It is inferred to have a continuing decline in (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats, such as climate change.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 44 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented, has six locations, and has a continuing decline in (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:

Eligible under Criterion C1 as Vulnerable

It is estimated that there are 1,500 to 10,000 mature individuals, and there is estimated to be a continuing decline of 30 to 80% (midpoint 50%) within three generations.

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 D2 as Vulnerable

The taxon is observed 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



Meesia muelleri Hump Moss

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. and Stone, I. G. (1976). *The Mosses of Southern Australia*. Academic Press: London.