Threatened Species Assessment

Distichium capillaceum
Fine Fringe-moss

Taxonomy

Distichium capillaceum (Hedw.) Bruch & Schimp.

It is suspected this is a cold climate/alpine taxon but if it is not fertile, other taxa could be confused with it.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A3bc+4c; B2ab(i,ii,iii,iv,v)

This assessment is based on inclusion of all four records. If only the two alpine records are included, the result is CR B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Species Information

Description and Life History

D. capillaceum is an acrocarpous moss. It is monoicous (paroicous) and sporophytes are very common, forming, at least in North America, in summer and autumn (eFloras, no date).

Generation Length

The generation length of *Distichium capillaceum* is estimated to be 11 to 25 years. This is 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 occurs in the alpine country on Nunniong Platueau and at Pretty Valley. It is also found in Tasmania and NSW.

Australasian Virtual Herbarium and Victoria Biodiversity Atlas (VBA) records from near Ballarat and Healesville date from 1890 and 1900, and have never been critically assessed. Dixon (1913) noted the likelihood of confusion with taxa of *Ditrichum,* and this is very likely the case with those records. However they have not been disproved so have been included in this assessment, while recognising that the taxon might be much rarer in Victoria that the records suggest.

Habitat

The taxon is lithophytic on at least mildly basic rock, and on sand dunes and mortared walls (Atherton 2010). Scott and Stone (1976) stated that in Australia it is an exclusively alpine moss. Southern Hemisphere records suggest it is confined largely to very cold habitats, ranging from alpine sites in New Guinea to low-elevation sites in the far south of New Zealand.

Threats

In alpine areas, the loss of habitat as a result of climate change is a threat. Elsewhere the major threat is the risk of more frequent and intense fires in a drying climate.

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 33 to 75 years is suspected to be 25 to 75% (midpoint 50%), based on (b) and (c) above.

It is very likely to decline in Victoria because of the effects of climate change. More frequent and more intense bushfires, in particular, are major threats at all sites, although the Nunniong subpopulation is likely to be well-protected from fire, being in a deep gorge.

Eligible under Criterion A4 as Endangered

The population reduction over any 33 to 75 year period, including both past and future, is observed to be 25 to 75% (midpoint 50%), 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 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:

Elibilbe under Criterion B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 10,169 km², based on accepted, post-1970 records in the VBA.

The taxon is estimated to be severely fragmented, as the known subpopulations are widely separated with no likelihood of genetic exchange between them, and little or no chance of recolonisation after an extinction event. It is inferred to have 1 to 4 (midpoint 2) locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the effects of climate change.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 16 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 1 to 4 (midpoint 2) 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

It is suspected that there are 400 to 4,000 (midpoint 2,000) mature individuals, but the qualifier is too weak and other thresholds under this criterion have not been met.

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 Vulnerable

The taxon is suspected to be very restricted.

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

References

Atherton, I., Bosanquet, S., and Lawley, M. (2010). *Mosses and liverworts of Great Britain and Ireland - a field guide.* British Bryological Society: London.

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