# Threatened Species Assessment

## *Distichophyllum crispulum*
## Crisped Mitre-moss

### Taxonomy

*Distichophyllum crispulum* (Hook. f. & Wilson) Mitt.

### 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 A3bce+4ce; B2ab(i,ii,iii,v)

### Species Information

#### Description and Life History

*D. crispulum* is a pleurocarpous moss. It is dioicous, and sporophytes are common between May and August (Streimann 2012).

#### Generation Length

The generation length of *Distichophyllum crispulum* 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 is known from widely scattered localities from the Otways to Mallacoota, and as far north as Marysville. Records from the Otways and Wilsons Promontory are supported by collections in MELU (not databased in the Australian Virtual Herbarium). It has not been found in the Baw Baws, despite widespread surveys (Meagher 2009). It is also found in Tasmania, NSW, ACT, Queensland, New Zealand, and Norfolk Island.

#### Habitat

In Victoria this taxon occurs in cool temperate rainforest and wet sclerophyll forest, where it grows on the trunks and roots of trees and tree-ferns, and on rocks, rotting logs and branches, and soil.

#### Threats

The known threats to the taxon are the loss of rainforest habitat caused by climate change, the associated risk of more frequent and intense fires, and the effects of Myrtle Wilt on *Nothofagus.* It is possible that some of the East Gippsland localities may have been affected by the 2020 fires but any impacts are not known.

## 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 40 to 60%, based on (b), (c) and (e) above.

This is inferred from the continuing decline of cool temperate rainforest in Victoria (D. Cameron, pers. comm.), along with the effects of bushfire on Wet Sclerophyll Forest.

**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 40 to 60%, based on (c) and (e) 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:

**Ineligible under Criterion B**

**Eligible under Criterion B1 as Vulnerable**

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4,237 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

Each of the five main localities is interpreted as a distinct location. Although the same threats apply, they may operate at different time-scales and intensities.

. It has a continuing decline in (i), (ii), (iii) and (v) above, based on the continuing decline in CTRF habitat in Victoria (DSE 2009) and the susceptibility of Wet Sclerophyll Forest to bushfire.

| 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 Vulnerable**

It is observed that there are 4,500 to 18,000 (midpoint 11,000) mature individuals. This is based on a high conservative estimate of individuals having 500 to 1,000 indviduals at each of the 8 sites. This small taxon typically occurs in small turfs of perhaps 100 plants, so an allowance has been made for up to 10 such minipopulations at each site.

There is estimated to be a continuing decline of 40 to 60% within three generations.

| 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<br>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:<br>AoO < 20 km2 or number of locations ≤ 5 |

## Evidence:

**Ineligible under Criterion D**

It is observed that there are 4,500 to 18,000 (midpoint 11,000) mature individuals which exceeds the thresholds for criterion D.

**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.

DSE (2009). Action Statement – Cool Temperate Rainforest, Dry Forest (Limestone), Warm Temperate Rainforest (Coastal East Gippsland), Warm Temperate Rainforest (Cool Temperate Overlap, Howe Range), Warm Temperate Rainforest East Gippsland Alluvial Terraces), Warm Temperate Rainforest Far East Gippsland), Human activity which results in artificially elevated levels of Myrtle Wilt within Nothofagus -dominate Cool Temperate Rainforest (No. 238). Department of Sustainability and Environment: East Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0016/32452/Human-activity.pdf

Hallingbäck, T., Hodgetts, N., Raeymaekers, G., Schumacker, R., Sérgio, C., Söderström, L., Stewart, N. and Váòa, 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.

Meagher, D. (2009). *The Baw Baw South Face bryophyte survey.* Final report. Report to the Department of Sustainability and Environment (unpublished).

Streimann, H. (2012) *Australian Mosses Online.* 11. Hookeriaceae: *Distichophyllum.* Retrieved from: http://www.anbg.gov.au/abrs/Mosses_Online/Distichophyllum.pdf