

## *Thuidium laeviusculum* Forest Weft-moss

### Taxonomy

*Thuidium laeviusculum* (Mitt.) A.Jaeger.

### Current conservation status

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

### Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,iv,v)

### Species Information

#### Description and Life History

The taxon is a perennial pleurocarpous moss. It is dioicous, and sporophytes seem to be uncommon in Victorian plants (D. Meagher, pers. obs.).

#### Generation Length

The generation length of *Thuidium laeviusculum* s.s. 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 known only from five localities in Victoria: two in the Otways, one in the Baw Baw Range, and two in far East Gippsland (based on Australasian Virtual Herbarium (AVH) and Victorian Biodiversity Atlas (VBA) data).

Records of the taxon in Western Australia, New South Wales and Queensland (AVH data) are all probably other taxa of *Thuidiaceae* (D. Meagher, pers. op.); identifications were probably based on erroneous descriptions in Scott and Stone (1985), noted by Touw and Falter-Van den Haak (1989).

It also occurs in New Zealand.

#### Habitat

The taxon grows on rocks, rotting logs, tree bases, and humus in cool temperate rainforest (Touw 2012). It is also known from very wet habitat in wet sclerophyll forest in the Otways (AVH data).

#### Threats

Major threats are loss of Cool Temperate Rainforest (CTRF) habitat as a result of climate change, together with the associated risk of more frequent and more severe fires. Opening of the canopy as a result of Myrtle wilt disease is also a threat, particularly in the Otways where the disease is widespread (DSE 2009, D. Cameron pers. comm. 2018).

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## 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> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## Evidence:

### Eligible under Criterion A3 as Vulnerable

The population reduction over the next 33 to 75 years is suspected to be 25 to 50%, based on (b), (c) and (e) above.

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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 <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 Criteiron B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8,885 km<sup>2</sup>, based on accepted, post-1970 records in the 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 the subpopulations. Such fragmentation precludes the possibility of recolonisation in the event of local extinction.

It is inferred to have 5 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats, such as climate change and Myrtle wilt disease.

### Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 12 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 5 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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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 as Data Deficient

There is no information about the sizes of the subpopulations. Taxa of *Thuidiaceae* may be extremely common at some sites and extremely rare at others, so there is no way to estimate the sizes of the subpopulations.

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 <sup>2</sup> or number of locations ≤ 5

## Evidence:

### Ineligible under Criterion D

There is insufficient evidence to determine the number of mature individuals.



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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:

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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.

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