



## *Lindsaea microphylla* Lacy Wedge-fern

### Taxonomy

*Lindsaea microphylla* Sw.

### Current conservation status

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

### Proposed conservation status

Endangered in Victoria

Criterion B2ab(iii)

### Species Information

#### Description and Life History

Tufted perennial fern. Fronds clustered, erect, often the tips drooping, 10-50 cm long, delicate to lacy. Stipe comparatively short, slender, light brown towards base then straw-coloured, sometimes mottled.

#### Generation Length

The generation length of *Lindsaea microphylla* is estimated to be 15 to 25 years. This is a small fern that may grow a few fronds per year, and after 4 years would probably produce spores.

#### Distribution

Although relatively widely distributed in East Gippsland, the taxon is rare and localized throughout the rest of its Victorian range (VicFlora). It occurs in Gembrook and the Powelltown area through to Rawson, Agnes River in the Strzelecki Ranges and in East Gippsland east of Orbost.

#### Habitat

The taxon grows naturally in heath and open-forest, but also in artificial excavations, and is often hidden and perhaps supported by undergrowth.

#### Threats

The bushfires of 2019/2020 are believed to have potentially impacted between 50 to 80% of the taxon's habitat. The taxon is sensitive to fire and is likely to have been significantly impacted, although the degree of damage is yet to be determined.

Ongoing and future threats included climate-change induced warming and drying, increased droughts and the risk of future fires.

### 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"> <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:

#### Ineligible under Criterion A2 as Vulnerable

The population reduction over the past or future 45 to 75 years does not meet the 30% threshold for this criterion. It is suspected to be 25 to 45% (midpoint 35%), based on (c) above.

This is based on the impacts of the 2019/20 bushfires.

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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 Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 288 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

Due to this taxon having many subpopulations that are well spread throughout its distribution, it is difficult to designate them to separate locations. At the conservative end of the range, locations include the Yarra Ranges/Gembrook area; the Erica area; Goongerah, Errinundra and Lind National Park area; Snowy River National Park; Mt Drummer/Coopracambra National Park area; Croajingolong National Park west of Mallacoota Inlet; and Croajingolong National Park east of Mallacoota Inlet. Alternatively, some of these locations are rather large (one extends to around 50 km) and could be split up into further locations which gives the larger number of locations in the range given.

The taxon is estimated to be severely fragmented, as it has a disjunct distribution with widely separated subpopulations, and little or no opportunity to share genetic material between the most separated subpopulations.

It has a continuing decline in (iii) 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:

#### Eligible under Criterion C2

It is estimated that there are 1,600 to 4,800 mature individuals. There are around 80 different sites in Victoria from which the taxon has been recorded from in the Atlas of Living Australia. Some herbarium records give some indication of abundance of this species where they occur (e.g. 10 and 24 plants). Plants have also been collected roadside locations in eastern Victoria which had 40-60 plants (D. Ohlsen pers. comm.). Many of the collecting sites without descriptions of abundance are similar to the sites with some indication of abundance. Based on this it is thought that the average subpopulation size for this species is 20 to 60 plants. So this range multiplied by the number of sites which the taxon has been recorded.

There is an inferred continuing decline, and the number of mature individuals in each subpopulation is fewer than 250.

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

It is estimated that there are 1,600 to 4,800 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.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria *Lindsaea microphylla*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/ad162c12-b8a6-4209-ba1d-e58787aa0bcb>