

Lindsaea trichomanoides Oval Wedge-fern

Taxonomy

Lindsaea trichomanoides Dryand.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2006).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2abc+3c+4abc; B1ab(i,ii,iii,iv,v); C2a(i,ii); D

Species Information

Description and Life History

Rhizome creeping, covered with narrow scales. Fronds close together, erect and quite stiff, 10–35 cm long. Stipe relatively long, wiry, dark brown to red-brown, shiny. Lamina lanceolate to oblong, mostly 2-pinnate, dark green, relatively coarse in texture; rachises red-brown. Pinnae shortly stalked, more distant towards base of frond; pinnules or lobes obovate to almost wedge-shaped with rounded outer margins, 4–10 mm long. Sori extending along outer margin, protected by membranous indusium (VicFlora 2019).

Generation Length

The generation length of *Lindsaea trichomanoides* is inferred to be 35 to 80 years (midpoint 55 years). The plants grow from a creeping rhizome so are relatively long-lived. They resprout in response to disturbance such as fire, but under pre-European settlement conditions, fire would have been rare in the rainforest habitat, perhaps no more often than 35 years at the most, more likely up to 80 years apart.

Distribution

The taxon has been reported from two isolated sites at Wilsons Promontory, at Chinaman's Creek and Lilly Pilly Gully but only one of them, near the headwaters of Chinaman Creek, has been confirmed recently (VicFlora, 2019).

Habitat

The taxon is found in cool temperate rainforest associated with gullies or streams.

Threats

Both sites where the taxon was recorded are in rainforest, which is highly vulnerable to fire. A major fire in the 1950s may have impacted areas of rainforest on the Promontory. Increased fire frequency and intensity, both natural and planned, are the major threat. Too frequent fires open the rainforest canopy, allowing desiccation and weed invasion. Extreme weather events, such as drought, temperature extremes, storms, flooding and associated erosion, are also threats. The Lilly Pilly Gully site was burnt in the early 2000s, and was significantly impacted by flooding and scouring in 2012.

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"> (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 A2 as Critically Endangered

The population reduction over the past 105 to 240 years is inferred to be 60 to 90%, based on (a) and (c) above.

There have been records from only two sites, only one of which has been recently confirmed, and the rainforest habitat has declined in quality as a result of fires and floods.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is suspected to be 75 to 95%, based on (c) above.

This is based on the ongoing loss of the rainforest habitat as a result of increased fires.

Eligible under Criterion A4 as Endangered

The population reduction over any 105 to 240 year period, including both past and future (up to 100 years in the future), is estimated to be 75 to 95%, based on (a) and (c)

Lindsaea trichomanoides Oval Wedge-fern

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas. The EoO has been made equal to the AoO to ensure consistency with the definition of the AoO as an area within the EoO.

It is estimated to have one location, as the single site is subject to the ongoing processes of excessive fire, drying and extreme weather.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has one location and a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Lindsaea trichomanoides

Oval Wedge-fern

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 as Critically Endangered

It is estimated that there are 0 to 10-20 to 50 mature individuals. The taxon is probably extinct, due to the failure to relocate it in several recent surveys, including a comprehensive survey by D. Ohlsen. If it does still exist in Victoria there must be very few individuals for it to remain unnoticed, probably no more than 50.

The number of mature individuals is estimated to continue to decline, the number of mature individuals in each subpopulation is 50 or fewer and the percentage of mature individuals in one subpopulation is 90-100 %.

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 D as Critically Endangered

The taxon is estimated to have fewer than 50 mature individuals.

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.



Lindsaea trichomanoides Oval Wedge-fern

Entwisle, T.J. (1994). Ferns and allied plants (Psilophyta, Lycopodiophyta, Polypodiophyta). In: Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria Vol. 2, Ferns and Allied Plants, Conifers and Monocotyledons*. Inkata Press, Melbourne.

SAC (2006). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 760 *Lindsaea trichomanoides*. Department of Environment and Primary Industries, Victoria.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Lindsaea trichomanoides*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/8112868e-8d6c-42c8-84e2-57db2b0db8ef>.