Threatened Species Assessment

Lastreopsis microsora subsp. *microsora*
Creeping Shield-fern

Taxonomy

Lastreopsis microsora subsp. *microsora* (Endl.) Tindale

This is distinguished from other species of *Lastreopsis* by its well-spaced fronds along a thin rhizome, and its broadly triangular, pale to mid-green, 3-pinnate, lamina with frequent hairs on veins, and leaflets with blunt apices and shallow teeth (VicFlora 2018).

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 A2abce+3ce+4abce; B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v); C2a(ii); D

Species Information

Description and Life History

The taxon is a terrestrial fern with a creeping rhizome, less than 6 mm diam., covered in brown scales. Fronds separated by more than 10 cm, erect to spreading, 40-90 cm tall. Stipe longer than lamina, hairy throughout, scaly at base, with scattered scales above. Lamina 3-pinnate, broadly triangular, pale green to mid-green, relatively soft, hairs frequent, mostly restricted to veins; rachises with abundant hairs and usually a few scattered scales. Pinnules asymmetrically oblong, blunt, with broad shallow teeth or lobes. Sori c. 1 mm or more diam.; indusium persistent, pale brown, with yellow glandular hairs near centre (VicFlora 2018).

Generation Length

The generation length of *Lastreopsis microsora* subsp. *microsora* is estimated to be 50 to 120 years. The long-creeping rhizomatous habit of this taxon suggests that individual patches may comprise no more than a single genet of great antiquity. Longevity is therefore potentially indefinite with very little reliance on spore recruitment for population maintenance. The only plausible cause of clonal mortality is likely to be landslip or flood damage or, under exceptional conditions, extreme and prolonged drought stress.

Distribution

In Victoria the taxon is confined to far East Gippsland, where apparently only found east of Cann River, but locally dominant in Warm Temperate Rainforest at, for example, Mt Drummer, Harrisons Creek and the Howe Range east of Mallacoota (VicFlora 2018). Two disjunct unvouchered site records in the Yalmy River catchment north of Orbost are likely to be misidentified *L. acuminata* which is common in the area. The taxon also occurs in New South Wales and Queensland.

Habitat

In Victoria the taxon is confined with great fidelity to Warm Temperate Rainforest where it is locally dominant (VicFlora 2018). It typically occupies deep loamy and usually organic soils on sheltered slopes and alluvial flats in Far East Gippsland, East Gippsland Alluvial Terraces and Cool Temperate Overlap, Howe Range Communities of Warm Temperate Rainforest.

Threats

The taxon is confined with great fidelity to Warm Temperate Rainforest and is associated with sheltered slopes and alluvial flats in Far East Gippsland, East Gippsland Alluvial Terraces and Cool Temperate Overlap, Howe Range Communities of Warm Temperate Rainforest, all of which are highly restricted and listed as threatened under *the Flora and Fauna Guarantee Act 1988*. The taxon is therefore highly susceptible to the impact of all current and projected threats to these listed communities, namely climatic warming and drying, increasing frequency, intensity and landscape scale of both bushfires and fuel reduction burns and the increasing impact of Sambar Deer (*Rusa unicolor*) browsing, rutting and wallowing behaviour, all of which have the capacity to limit vegetative resprouting of established clones from subterranean rhizomes.

The bushfires of 2019/2020 are estimated to have impacted more than 80% of the taxon's habitat. The taxon is sensitive to the indirect impact of intense fire on the extent, quality and persistence of its Warm Temperate Rainforest habitat and is likely to have been significantly impacted, although the extent of this impact is yet to be determined.

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 A2 as Endangered

The population reduction over the past 150 to 360 years is estimated to be 30 to 70% (midpoint 50%), based on (c) and (e) above.

Historic habitat loss to agriculture is likely to have been negligible and potentially confined to the Cann, Genoa and Wallagaraugh River Valleys and lower reaches of Dowell and Harrison Creeks. An estimate of past decline is based largely on the impact of a succession of intense bushfire events, acting synergistically with the impact of clearfell harvesting of adjacent sclerophyll forests, resulting in contraction in the extent of Warm Temperate Rainforest stands, as documented by Norman Wakefield and David Cameron at Mt Drummer and by D. Cameron,

Evan Chesterfield and Nick Shaw at Jones Creek and by D. Cameron, Neville Walsh and others at Harrisons Creek in the Howe Range (D. Cameron pers. obs.).

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is projected to be 50 to 75%, based on (c) and (e) above.

Future fires, recruitment failure as a result of drought stress and contraction in suitable habitat are likely to drive significant declines.

Eligible under Criterion A4 as Endangered

The population reduction over any 150 to 360 year period, including both past and future (up to 100 years in the future), is estimated to be 40 to 80% (midpoint 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:

Eligible under Criterion B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,090 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA) and Atlas of Living Australia (ALA).

The taxon is estimated to be severely fragmented naturally at the landscape scale since wind dispersal of spore is likely to be greatly constrained by the sheltered habitat of the taxon in the understorey of mature Warm Temperate Rainforest with an intact closed canopy in gullies and lower slopes in dissected landscapes and the inference that the taxon can only recruit successfully in mature stands of a highly fragmented community.

It is estimated to have one location, based on the key identified threats which operate consistently across the restricted ecological and geographic range of the taxon in Victoria.

It has a continuing decline in (ii), (iii) (iv) and (v) above, based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 96 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA and ALA. As above, it is severely fragmented, has one location and has a continuing decline in (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:

Eligible under Criterion C2 as Endangered

It is estimated that there are 30 to 400 (midpoint 200) mature individuals. The long-creeping rhizome has the capacity to support numerous fronds over a large more-or-less continuous patch. Such patches can therefore be misinterpreted as many plants yet may represent no more than a single clone or genet. An estimate of current population size is based on the likelihood that there may be only 1-5 (-10) long-established clones in a typical stand of rainforest or subpopulation.

There are fewer than 250 individuals in each subpopulation.

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 Endangered

It is estimated that there are 30 to 400 (midpoint 200) 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.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Lastreopsis microsora* subsp. *microsora*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/dd4473c8-3c91-4d56-b8a4-f35e73abc77f.