Threatened Species Assessment

Pteris epaleata
Netted Brake

Taxonomy

Pteris epaleata D.J.Ohlsen.

Pteris epaleata is a segregate of *Pteris comans* G.Forst., the latter name misapplied to plants in Australia and New Zealand. *P. comans* has been broadly circumscribed to encompass a variable assemblage of ferns throughout the Pacific and eastern Australia with anastomosing veins and large, dissected fronds. Populations from the tropical Pacific differ from populations in Australia and New Zealand in frond dissection and indumentum. Australian and New Zealand populations were shown to be more closely related to other New Zealand species than to tropical Pacific *P. comans* and have recently been described as a new species, *P. epaleata* (Ohlsen et al. 2020).

The fronds of *Pteris epaleata* are very similar to *Histiopteris incisa*, but the latter has distinctive paired pinnules at the base of each pinna, and the margins are entire or only slightly crenate (never serrate). The lamina of *P. epaleata* is also darker in colour, and never has the blue-green to pale green coloration of *H. incisa* (VicFlora 2020).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2c+4; B2ab(i,ii,iii,iv,v); C2a(i)

Species Information

Description and Life History

Rhizome erect, short and stout, covered with brown scales with slender tips. Fronds tufted, erect but arching at tips, 80-160 cm long, relatively soft-textured. Stipe long, stout, brown and purplish towards base, brown to olive-green above. Lamina 3-4-pinnate, broadly triangular, dark green, glabrous except for scattered, short hairs along lower surface of midveins and rachises; rachises often pale and yellowish. Pinnae narrower in fertile frond; primary pinnae distant, lower pinnae asymmetrically triangular to ovate; secondary pinnae triangular-ovate to ovate-oblong, bases decurrent, apices frequently tapering and serrate. Pinnules obliquely oblong, sessile, decurrent, margins broadly and deeply serrate or crenate; veins free towards margin but anastomosing to form series of areoles near midvein. Sori continuous along lateral margins, often extending down decurrent bases but never around tips.

Generation Length

The generation length of *Pteris epaleata* is estimated to be 10 to 40 years. Some plants have been observed by D. Ohlsen over a 10 year period, suggesting that this taxon can live for at least 10 years.

Distribution

In Victoria the taxon occurs between the Grampians and Warrnambool in the west to Wilsons Promontory and the Dargo area in the east.

Habitat

The taxon occurs in poorly drained drainage lines and beside creeks in sclerophyll forest and rainforest, also on rocky outcrops and cliffs where there is seepage.

Threats

The bushfires of 2019/2020 are believed to have potentially impacted up to 20% 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.

Being reliant on moist conditions, drought that may be expected to become more severe as a result of climate change is a major theat. Increased severity and frequency of fire is also a threat as this species dies once burnt and does not depend on fire for its recruitment. Rainforest communities are also being affected by damage and grazing by deer and deer may disturb creekside sites that can easily get eroded.

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 30 to 120 years is estimated to be 50%, based on (c) above.

This is based on approximately 50 % of the area that may have had suitable habitat in southern Victoria being cleared in the past 120 years.

The causes of the 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 96 or 172 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The lower value is based on records from which those older than 100 years have been excluded. The upper value includes other sites that are more than 210 years old.

The taxon is estimated to be severely fragmented. Many subpopulations are highly disjunct from the nearest subpopulation and many subpopulations are small, being described in collecting notes as consisting of a few plants.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above, based the impacts of the identified threats, such as fire, drought, and weed invasion’

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 310 to 660 mature individuals. Three records indicate this species locally common or a dominant understorey component. 60 to 80 plants are estimated for these subpopulations. Based on personal observation (D. Ohlsen pers. comm.) and other notes of subpopulations consisting of a few plants, it is estimated that the remaining subpopulations will have 10 to 20 plants as an average, but perhaps none in the six sites that this species has not been recorded at for over 100 years.

The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is fewer than 250.

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 Vulnerable

It is estimated that there are 310 to 660 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.

Ohlsen, D.J., Brownsey, P.J., Shepherd, L.D., Perrie, L.R., May, E.L., Chen, C-W. & Bayly, M.J. (2020).*Pteris epaleata*, a new fern species from Australia and New Zealand segregated from *P. comans* (Pteridaceae), *Muelleria* 39: 17-26.

VicFlora (2014). Flora of Victoria, Royal Botanic Gardens Victoria: *Pteris epaleata,* Royal Botanic Gardens Victoria. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/72b11863-9b98-4333-bb15-734c0cbed7ef