Threatened Species Assessment

Adiantum formosum
Black Stem

Taxonomy

Adiantum formosum R. Br.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ce+3ce+4ce; C2a(i)

Species Information

Description and Life History

Rhizome creeping, coarse, covered with scales. Fronds well separated, erect, 60-100 cm long. Stipe long, relatively stout, purplish-brown to black, polished, slightly roughened, scaly near base. Lamina broadly triangular, 3-4-pinnate, dark green, moderately firm, glabrous; rachises dark brown to black, minor rachises with short, curved, reddish-brown hairs. Pinnae shortly stalked, distant; pinnules short stalked at corners, sub-rhomboidal, asymmetric, 5-15 mm long, 2-6 mm wide, lower margins almost straight and entire, upper margins rounded, shallowly or deeply lobed, scalloped or toothed. Sori 4-8, relatively small, in shallow depressions of lobes, covered by broadly half-moon shaped to oblong reflexed leaf flap (VicFlora no date).

Generation Length

The generation length of *Adiantum formosum* is observed to be 20 to 30 years. Most plants known are large widely creeping by an underground rhizome which would probably need at least 20 years to develop to that size.

Distribution

The taxon occurs in East Gippsland along the Snowy River, near Club Terrace, near Cann River and near Wangarabell near the New South Wales border.

Habitat

The taxon occurs in East Gippsland along the Snowy River, near Club Terrace, near Cann River and near Wangarabell near the New South Wales border.

Threats

The bushfires of 2019/2020 are believed to have impacted more than 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. The taxon is a (rainforest) species that do not require fire for regeneration and are likely to be killed by fire.

An increase in the frequency and severity of bushfires may well drive the taxon to near extinction. It is also threatened by weed invasion, and by browsing and trampling by Sambar Deer (*Rusa unicolor*). Sambar pose a threat to all populations. Not all populations are reserved, and are vulnerable to several threats (e.g. the population

collected from Neillson Creek near Cann River had heavily degraded vegetation and is vulnerable to clearing by landholders. The population at Wood Point is vulnerable to trampling associated with recreational activities, as it is close to a camping ground. The population at Pipe Clay Creek is suffering from blackberry infestation.

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 Critically Endangered

The population reduction over the past 60 to 90 years is estimated to be 80 to 85%, based on (c) and (e) above.

This is based on an 80% reduction in suitable habitat and further ongoing threats (e.g. weed infestation, Sambar).

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 60 to 90 years is projected to be 78 to 99%, based on (c) and (e) above.

Future decline is based on the identified threats, notably future fires and damage by Sambar.

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 90 year period, including both past and future, is estimated to be 78 to 99 (midpoint 85%, based on (c) 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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 1,202 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 48 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

Any two of (a), (b) or (c) above are also satisfied.

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 38 to 160 mature individuals, calculated by the addition of all subpopulation estimates. All subpopulations are likely to be small (no more than 30 individuals) and some subpopulations are isolated from the closest subpopulation by over 30 km.

The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is 50 or fewer.

The taxon is subject to continuing decline in population size due to the identified threats.

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

The taxon is estimated to have 38 to 160 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: *Adiantum formosum* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/8248f208-5b0f-4a1e-8f10-95c8584a90f9