Threatened Species Assessment

Styphelia esquamata
Swamp Beard-heath

Taxonomy

Styphelia esquamata (R. Br.) Spreng.

Up until 2020 this taxon was known as *Leucopogon esquamatus* R.Br.

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 A4ce; B1ab(iii,v)+2ab(iii,v)

Species Information

Description and Life History

The taxon is an erect, leafy shrub, 20-100 cm high; branchlets glabrous. Leaves erect, narrowly elliptic or obovate, 10-22 mm long, 2-4 mm wide, flat, sometimes slightly twisted, slightly discolorous, glabrous, indistinctly nerved; margins entire; apex acuminate, terminated by a mucro c. 1 mm long. Flowers white, short-lived, solitary or paired in upper axils; bracteoles broadly ovate, 1.2-1.5 mm long, obtuse, glabrous; sepals ovate, 2.1-2.7 mm long, obtuse, glabrous; corolla c. 4 mm long, lobes c. twice as long as tube, acute, recurved only in upper part, erect below, densely bearded within; anthers lacking sterile tips; ovary glabrous, 2-locular, style 2-2.9 mm long, shortly exserted from corolla tube. Fruit narrowly obovoid, c. 4 mm long. The taxon flowers from August to September (VicFlora 2017).

Generation Length

The generation length of *Styphelia esquamata* is estimated to be 35 to 70 years. The taxon is a long-lived perennial shrub. It is likely to recruit episodically following rare and intense fire events at an estimated pre-European settlement interval of 35-70 years. The taxon's habitat of typically dense vegetation in poorly drained coastal heathlands is likely to burn with high intensity capable of incinerating the entire crown and often destroying the rootstock. Where fire intensity is low, the taxon may resprout from rootstock, thus extending the life of the plant. Longevity is likely to be limited only by fire interval with little opportunity for recruitment in the absence of fire.

Distribution

In Victoria, the taxon is confined to near-coastal sites in East Gippsland, extending eastwards from Marlo to Cape Howe on the NSW border. It can be rather common locally. The taxon also occurs in Tasmania, New South Wales and Queensland (VicFlora 2017).

Habitat

In Victoria, the taxon is confined to poorly drained sites in near-coastal heathlands (VicFlora 2017).

Threats

Historically, the taxon is likely to have suffered only minor decline through habitat loss to agriculture in the Marlo to Cape Conran district.

The taxon is a habitat specialist threatened predominantly by climatic drying resulting in contraction in the local extent of suitable habitat. The taxon may also be threatened by the increasing frequency and intensity of fire. Repeat fire events at intervals approaching the tolerable fire interval (TFI) of the taxon increase the risk of seedbank depletion and local extinction. Intense fire also increases the risk of incineration of the peaty substrate, exposing mineral earth unable to support wet heath habitat on which the taxon depends.

Wet heath vegetation is projected to decline in response to tree and shrub invasion, including by *Leptospermum laevigatum* (Coast Tea-tree) and by *Eucalyptus botryoides* (Southern Mahogany) (Scicluna *et al*. 2018).

The taxon may also be threatened by casual or targeted browsing by Sambar Deer (*Rusa unicolor*) or Hog Deer (*Axis porcinus*) particularly during post-fire recruitment, and through excavation by feral pigs.

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 A3 as Vulnerable

The population reduction over the next 100 years is projected to be 24 to 55 percent (midpoint 40%), based on (c) and (e) above.

This is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 105 to 210 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 65 percent (midpoint 45%), based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

This is based on historic habitat loss to agriculture in the Marlo to Cape Conran district and the future projected effects of the identified threats.

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 across the taxon's range is estimated to be 1,196 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the landscape scale since most occurrences are at distances greatly exceeding the dispersal range of the taxon, which is likely to be dispersed by ants (myrmecochory) at scales of metres.

It is estimated to have one location. It has a continuing decline in (iii) and (v) above.

Eligible under Criterion B2 as Endangered

The Area of Occupancy across the taxon's range is estimated to be 60 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has one location and has a continuing decline in (iii) 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:

Ineligible under Criterion C as Data Deficient

There is no available estimate of total population size although it may approach or exceed 1000 mature individuals. The habitat of the taxon is typically of restricted local extent and it typically occurs at low density with projective foliage cover of 1-5%, rarely exceeding 5% at the quadrat scale.

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 D2 as Vulnerable

The taxon is estimated to be very restricted.

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. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

Scicluna E.L., Makdissi R., Gribble M.J., Loukes B.T., Hernandez O.F. and Morgan J.W. (2018). Recent encroachment on a Wet Heathland by eucalypts at Cape Conran, Victoria. *The Victorian Naturalist* 135, 4-9.

VicFlora (2020). Flora of Victoria, Royal Botanic Gardens Victoria: *Styphelia esquamata*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/25e51709-c55d-4599-8aa8-57359de01339