Threatened Species Assessment

Leucopogon neurophyllus
Veined Beard-heath

Taxonomy

Leucopogon neurophyllus F. Muell.

Current conservation status

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

Proposed conservation status

Endangered in Austral

Criteria B1ab(iii,iv,v)+2ab(iii,iv,v); C1

Species Information

Description and Life History

The taxon is a dense, much-branched shrub, to c. 2 m high; branchlets glabrous. Leaves erect, narrowly elliptic, 12-45 mm long, 2-8 mm wide, flat or slightly convex, slightly paler beneath, glabrous, both surfaces prominently lined by 3-7 translucent veins; margins serrulate; apex acuminate, somewhat thickened and narrowly channelled. Flowers white, 3-11 in terminal and upper-axillary spikes 8-16 mm long; bracteoles ovate, 0.9-1.8 mm long, acute, glabrous; sepals ovate, 1.6-3.2 mm long, acute; corolla 3-4 mm long, lobes equal to or slightly longer than tube, acute, densely bearded within; anthers with recurved sterile tips; ovary glabrous, 2(-3)-locular, style 0.3-0.7 mm long. Fruit spherical or obovoid, c. 2.5 mm long. The taxon flowers from September to January (VicFlora 2019).

Generation Length

The generation length of *Leucopogon neurophyllus* is estimated to be 50 to 80 (midpoint 60) years, based on a longevity of potentially 50 to 80 years. Recruitment is likely to be both fire-cued and pulsed, superimposed over a more continuous recruitment profile in response to seasonal conditions and other localised disturbance events. The pre-European settlement fire interval in moist forest and woodland habitats in the Grampians is likely to be 50 to 100 years. The taxon's generation time is likely to be closely tied to longevity.

Distribution

The taxon is endemic in Victoria. It is confined to higher parts of the Grampians (e.g. Major Mitchell Plateau, Victoria Range) and nearby Mounts Langi Ghiran and Ben Nevis (VicFlora 2019; Powell et al. 1996).

Habitat

The taxon occurs in moist forest and rocky shrubland communities (VicFlora 2019; Powell et al. 1996). Associated species from quadrat data strongly suggest the taxon has some reliance on moisture availability and/or shelter, implying lower drought tolerance and potentially greater fire sensitivity than many other *Leucopogon* taxa in the region.

Threats

The taxon is threatened by the stochastic impacts of climatic drying, and associated alteration of fire intensity, frequency, and landscape scale. It is also threatened by the risk of repeat fire events with tolerable fire interval of 15-20 years for adequate resprouting under moderate fire intensity and potential seed recruitment.

The taxon is further threatened by climatic warming resulting in an increasing risk of adult mortality and recruitment failure in response to extreme drought stress.

The taxon is potentially threatened by targeted browsing pressure, noting the similarity of the taxon to *L. parviflorus* which, in coastal sites, can be heavily browsed by domestic stock. The taxon is therefore potentially palatable enough to be vulnerable deer browsing, particularly Red Deer which frequent moisture habitats, rather than Fallow Deer and goats, which tend to occupy drier and rockier habitats.

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 20 to 40% (midpoint 30%), based on (c) above.

This is based on the stochastic impacts of climatic drying and warming and associated alteration for fire intensity, frequency, and landscape scale and the risk of repeat fire events with tolerable fire interval of 15-20 years for adequate resprouting under moderate fire intensity and potential seed recruitment. The taxon is also threatened by adult mortality and recruitment failure in response to extreme drought stress and targeted browsing pressure.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 150 to 240 year period, including both past and future (up to 100 years in the future), is estimated to be 25 to 50% (midpoint 35%), based on (c) above.

Past decline is based on based largely on a recent increase in anthropogenic fire activity and drought. Future decline of the taxon is based on impacts 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 (EoO) across the taxon's range is estimated to be 1,124 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. Most subpopulations occur at separations greatly exceeding the highly localised dispersal range of the taxon, which is unlikely to be dispersed to any significant extent by animal vectors since the taxon does not have fleshy, succulent fruit.

It has a continuing decline in (iii), (iv) and (v) above, as a result of the impacts of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 100 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA, As above, it is estimated to be severely fragmented, and has a continuing decline in (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 C as Endangered

It is estimated that there are 1,000 to 5,000 mature individuals. The current population is based on field observations of representative subpopulations.

There is estimated to be a continuing decline of 20 to 40% (midpoint 30%) within two generations.

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

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

Powell, J.M., Walsh, N.G., and Brown, E.A. (1996). *Leucopogon.* In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae.* Melbourne: Inkata Press

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Leucopogon neurophyllus.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/579d4a2e-d428-455d-ab76-e21c30e7344e.