Threatened Species Assessment

Nematolepis frondosa
Leafy Nematolepis

Taxonomy

Nematolepis frondosa (N.G. Walsh & Albr.) Paul G. Wilson

Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2005).

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

Proposed conservation status

Critically Endangered in Australia

Criteria B1ab(iii,v)+2ab(iii,v)

Species Information

Description and Life History

The taxon is a shrub to 7 m high, often branching almost horizontally. Branchlets are strongly angled, densely rusty or silvery hairy. Leaves are leathery, broad-ovate, 8-23 mm long, 6-15 mm wide, obtuse or slightly notched at the tip, upper surface smooth, glandular, often appearing white-speckled, lower surface densely silver hairy, smooth, margin flat with 2-5 mm long stalks. Flower clusters are decurved to pendent, in the axils of leaves. Petals are white and 4-6 mm long. Fruits comprise five follicles, each with 1-2 seeds which are released explosively. The taxon flowers in winter and spring (VicFlora 2016).

Generation Length

The generation length of *Nematolepis frondosa* is inferred to be 35 to 90 years. This is based on a plausible longevity of 35-70 years. It is also based on the taxon's high sensitivity to fire, the likely episodic recruitment following plausible pre-settlement fire intervals of 35-90 years, and the known capacity for members of the Rutaceae family to maintain long-persistent soil-stored seedbanks.

Distribution

The taxon is endemic to eastern Victoria, where it is restricted to the upper slopes of Mt Elizabeth, between Bruthen and Ensay. The single population was estimated to contain 3,100 plants, in three discrete groups (subpopulations) containing 2,000 plants, 1,000 plants and 100 plants respectively. All of the known individuals of the taxon are protected within the Mount Elizabeth Nature Conservation Reserve, which was gazetted in 2004.

Habitat

The taxon occurs at an altitude of 820 to 960m on Mt Elizabeth. It grows in varied habitat, ranging from low rock outcrop scrub near the mountain summit to tall open forest dominated by *Eucalyptus regnans* (Mountain Ash) at the lower altitudinal range. Associated species within the rock outcrop scrub include *Kunzea ericoides* spp. agg. (Burgan), *Pomaderris aspera* (Hazel Pomaderris), *Pomaderris prunifolia* (Plum-leaf Pomaderris) and *Ozothamnus cuneifolius* (Wedge-leaf Everlasting). Tall open forest sites on lower slopes contain *Acacia dealbata* (Silver Wattle), *Olearia lirata* (Snowy Daisy bush), *Prostanthera walteri* (Monkey Mint-bush) and *Zieria arborescens* (Stinkwood).

Topography varies from flat to moderately steep on south, south-westerly, north, north-westerly and westerly aspects. Soils vary from skeletal at the summit subpopulation, to deep mountain loams, on rhyolitic or granodiorite parent material (SSC 2016, DSE 2008).

Threats

Key threats to the taxon include the increasing risk of intense fire events likely to result in mortality of the only known occurrence, the increasing risk of recruitment failure due to drought stress, and herbivory by Sambar Deer (*Rusa unicolor*). Threats also include the continuing impact of wallaby browsing (particularly during early recruitment), the potential impact of Sambar antler rubbing on adult individuals, the stochastic risk of road maintenance activity eliminating individuals close to existing tracks operations. The risk of browsing and antler rubbing by Sambar Deer (*Rusa unicolor*) is considered particularly significant for this taxon, based on the documented catastrophic impact of Sambar on both adult individuals and recruiting subpopulations of *Nematolepis wilsonii* and *Acronychia oblongifolia* (TSSC 2016). All of the known individuals of Leafy Nematolepis are protected within the Mount Elizabeth Nature Conservation Reserve, which was gazetted in 2004.

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 last 105 to 270 years is suspected to be 20 to 50%, based on (c) and (e) above.

There may have been a minor loss in the past due to trackwork activities, but there is expected to have been a more serious loss as a result of the 2019/20 bushfires. The fires are believed to have resulted in all or most of the taxon's habitat being burnt at high intensity. It is believed to be fire sensitive in the context of these fires and although the impacts of the fires are yet to be determined, it is likely that the taxon suffered some mortality, directly as a result of the fires or indirectly from post-fire impacts. However, given the good rains in 2020, it is likely to recover reasonably well. The fires may have promoted some regeneration, but it is possible this may have been impacted by feral herbivores.

Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is suspected to be 30 to 80% (midpoint 50%), based on (c) and (e) above.

Despite the impacts of the 2019/20 fires, the taxon should recruit from soil-stored seed. The primary threats now are damage by Sambar, a following summer drought leading to recruitment failure, or future repeat fires.

Eligible under Criterion A4 as Endangered

The population reduction over any 105 to 270 year period, including both past and future (up to 100 years in the future), is suspected to be 20 to 70% (midpoint 50%), based on (c) and (e) above.

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Area of Occupancy (AoO) to ensure consistency with the definition of the AoO as an area within the EoO.

It is estimated to have one location because all the key identified threats apply across the range of the taxon and can rapidly affect all individuals of the taxon present.

It has a continuing decline in (iii) and (v) above, based on the impacts of the identified threats.

Eligible under Criterion B2 as Critically Endangered

The (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 1 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

It is estimated that there are 2,600 to 3,100 mature individuals, but other thresholds under this criterion have not been met.

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

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