Threatened Species Assessment

Muehlenbeckia gracillima
Slender Lignum

Taxonomy

Muehlenbeckia gracillima Meisn.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2003).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ce+3ce+4ce; B1ab(i,ii,iii,iv,v); C1; D

Species Information

Description and Life History

Slender Lignum is a slender twiner with stems ascending to 2 m or more in height or length. The stems arise from a carrot-like rootstock and are either glabrous or bear scattered papillae or tubercles. Leaves are ovate to triangular, 2-8 cm long, 1-4 cm wide, the apex acuminate and the base more or less sagittate, the margins finely and irregularly crisped. The petioles are often subequal to the blade in length. Flowers are in small clusters within very slender, interrupted, spike-like or commonly branched inflorescences 5-15 cm long, the pedicels mostly shortly exceed the subtending bract. Perianth segments are free almost to the base, green at first, 1-2 mm long, slightly longer and becoming yellow and swollen in fruit but remaining membranous. The seed develops within a watery yellow fruit which at maturity is a broadly ovoid nut 2-2.5 mm long which is obscurely 3-ribbed, finely wrinkled or warted and black (SAC 2003). The taxon flowers mostly from November to March (VicFlora 2016).

Generation Length

The generation length of *Muehlenbeckia gracillima* is estimated to be 45 to 90 years based on the likely ability of the taxon to resprout from a persistent root stock, thus extending the life of the individual beyond the impact of stochastic events such as flood or landslip. The taxon is a secondary rainforest vine which commonly inhabits sandy or silty stream banks on the margins of rainforest, in canopy gaps, within riparian rainforest stands or wet lowland forest or Riparian Forest. Whilst the rainforest habitat was almost never subjected to intense fire in the pre-settlement landscape, these microhabitats are subject to stochastic, recurrent events throughout the generational time frame. Whilst longevity is unknown, it is likely to exceed the mean frequency of stochastic gap-creating events.

Distribution

The taxon is known from Cann River and Genoa in far East Gippsland. The first Victorian collection was taken from Genoa in February 1887and subsequently collected in 1938 from a rich alluvial flat in Cann River township. Despite regular searching by several botanists in the years that followed, the taxon could not be relocated at or near its last known site in Cann River and was believed to be extinct until rediscovered in the vicinity in 2002 (SAC 2003).

It has since been incorporated into revegetation projects along the lower reaches of some East Gippsland rivers (e.g., Genoa, Cann) so obscuring its natural occurrence, but possibly reinstating it to previous unknown sites of occurrence (VicFlora 2016).

Habitat

The taxon commonly inhabits sandy alluvium or silty streambanks on the margins of rainforest, in canopy gaps within riparian rainforest stands or wet lowland forests (VicFlora 2016; SAC 2003). In Victoria, the taxon is reported to occur within highly disturbed remnant stands of Alluvial Terraces Warm Temperate Rainforest and might be expected to occur also in adjacent stands of Riparian Forest (SAC 2003).

Threats

Historically, the Victorian population of Slender Lignum is presumed to have been depleted almost to the point of extinction through loss of rainforest and associated riparian habitat in the Cann and Genoa River valleys (and possibly elsewhere in East Gippsland such as the Snowy River valley), through vegetation clearance for agricultural and township development.

The Victorian population is directly threatened by stochastic events such as fire or flood and by browsing pressure, particularly by domestic cattle and Sambar Deer given that they selectively target it. Sambar are undergoing a population explosion throughout the region. Such grazing appears to limit the population to the protective cover of blackberry thickets and the camouflage of non-palatable native secondary rainforest species such as *Ozothamnus ferrugineus* and *Solanum aviculare* (SAC 2003). The taxon is also indirectly threatened by the further degradation of the rainforest habitat through weed invasion and fragmentation, or accidental destruction during weed control or other river works (SAC 2003).

The subpopulation immediately upstream of Cann River township is further threatened by elimination through stochastic events, since the population is reported to consist of only seven mature individuals, comprising four male and three female plants (one female plant, the first to be collected has not been found since).

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 135 to 270 years is estimated to be 80 to 95%, based on (c) and (e) above.

Past decline is based on the near total historic elimination of the extensive stands of Warm Temperate Rainforest in the Cann Valley to agriculture and township development.

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 100 years is projected to be 50 to 100% (midpoint 80%), based on (c) and (e) above.

Future decline is based on the threats of stochastic events such as fire or flood and browsing by domestic cattle or Sambar. It is also based on the degradation of the rainforest habitat through agricultural activity, weed invasion and fragmentation or accidental destruction during weed control or other river works.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 135 to 270 year period, including both past and future (up to 100 years in the future), is projected to be 80 to 100%, based on (c) and (e) 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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 19 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the subregional scale and anthropogenically at the landscape scale. Occurrences are situated at separations that are likely to exceed the dispersal range of the taxon, therefore the probability of recolonisation, in the event of local extinction, is remote.

It and is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

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 Critically Endangered

The taxon is estimated to have 7 to 40 mature individuals.

The rediscovered occurrence at Cann River in 2002 comprised only 7-8 mature individuals at two sites 3 km apart in the same river valley (SAC 2003). Recent counts of about 50 plants over an area about 20 x 20 metres at the Cann River site may represent root suckers from one or very few individuals with well-developed rootstocks.

Furthermore, counts of 20 individuals at one site and 10 at a second nearby site at Genoa are likely to represent reintroductions to the site established by Bill Peel as part of a revegetation project. It is unclear whether the Genoa occurrence is indigenous or a self-propagating reintroduction.

There is estimated to be a continuing decline of 25 to 50% (midpoint 40%) within one generation.

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 Critically Endangered

The taxon is estimated to have 7 to 40 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.

SAC (2003). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 690 *Muehlenbeckia gracillima.* Department of Environment and Primary Industries, Victoria.

VicFlora (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Muehlenbeckia gracillima.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b6c53fbd-d80d-40b0-9777-ee5ee3395e10

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