Threatened Species Assessment

Mirbelia rubiifolia
Heathy Mirbelia

Taxonomy

Mirbelia rubiifolia (Andrews) G. Don

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 B1ab(iii)+2ab(iii)

Species Information

Description and Life History

The taxon is a diffuse spreading shrub to 0.5 m tall; stems angular, glabrous or appressed-pubescent. Leaves usually in whorls of 3, lanceolate to linear-oblong, mostly 10-25 mm long, 2-4 mm wide, lower surface glabrous or with a few scattered hairs, upper surface glabrous, reticulate, margins recurved, apex acute, pungent-pointed; petiole to c. 1 mm long. Inflorescence an axillary cluster or umbel-like terminal raceme; pedicels to c. 2 mm long, silky. Calyx 3-4 mm long, sparsely pubescent, teeth shorter than tube, upper 2 almost completely fused; corolla 8-9 mm long, pink to purple, rarely white; standard reniform, deep pink with purplish markings; keel much shorter than wings, dark purplish; ovary shortly stipitate, glabrous, ovules 2. Pod ovoid, c. 5 mm long, beaked, glabrous, dark brown; seeds usually 2, c. 2.5 mm long. The taxon flowers from October to December (VicFlora 2019).

Generation Length

The generation length of *Mirbelia rubifolia* is estimated to be 20 to 30 years. This is based on its life form, a plausible longevity of 30 years, and the generation length of *Mirbelia* taxa in cultivation. Whilst individuals are likely to resprout from rootstock, it is likely that episodic fire-induced mass recruitment greatly exceeds the proportion of recruitment responding continuously to small scale soil disturbances. Pre-settlement fire intervals were plausibly in the 20-40 year range.

Distribution

The taxon is known in Victoria by a single small subpopulation within Croajingolong National Park near Mallacoota. The taxon also occurs in Queensland and New South Wales (VicFlora 2019).

Habitat

In Victoria the taxon grows on grey sand in open areas along a walking track, in coastal, dense, shrubby heathland, dominated by *Allocasuarina paludosa* in association with: *Acacia myrtifolia, A. suaveolens, Anisopogon avenaceus, Astroloma humifusum, Banksia marginata, Boronia nana var. hyssopifolia, Bossiaea ensata, Burchardia umbellata, Comesperma retusum, Coronidium scorpioides, Dampiera stricta, Dillwynia glaberrima, Euphrasia collina, Gompholobium huegelii, Hakea teretifolia, H. ulicina, Leptospermum continentate, Lindsaea linearis, Ozothamnus cuneifolius, Patersonia fragilis, Scaevola ramosissima, Sphaerolobium minus, Viola cleistogamoides,* and *Xanthorrhoea caespitosa.*

In NSW, the taxon is widespread in heath and sclerophyll forest on sandy soils, north from Jervis Bay.

Threats

The taxon is threatened by planned burning, and climatic warming and drying which, synergistically, increase the risk of recruitment failure in response to repeat fire events and extreme drought stress. Mild fires may leave the stand unaffected, but an intense fire is likely to consume and kill the entire stand. The taxon is at risk of local extinction from a combination of severe fire and recruitment failure due to drought stress and/or repeat fire.

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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been a reduction in population (criterion A2). The future population reduction does not meet the threshold for eligibility under criterion A3.

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 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Occupancy to ensure consistency with the definition of AoO as an area within EoO.

It is estimated to have one location as individuals occur in the same subpopulation where the key identified threats apply across its range and can rapidly affect all individuals of the taxon present.

It has a continuing decline in (iii) above, based on the current and projected impact of the identified threats, such as climatic warming and drying, repeat fire events, and extreme drought stress.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon has 1 location, and has a continuing decline in (iii) 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 C1 as Vulnerable

It is estimated that there are 200 to 400 mature individuals based on herbarium collections held at National Herbarium of Victoria at the Royal Botanic Gardens Victoria.

The notes on the 2009 collection indicate that "Several hundred plants seen over an area of about two hectares, about 300 plants sampled for the Victorian Conservation Seedbank." The notes on the 2017 collection indicate that the taxon was "Common at site, > 100 plants, but localised over ca. 50 metres of track length."

There is estimated to be a continuing decline of 10% within three 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

It is estimated that there are 200 to 400 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. 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

PlantNET (2019). New South Wales Flora Online, Royal Botanic Garden Sydney: *Mirbelia rubiifolia.* Retrieved from: http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Mirbelia~rubiifolia

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Mirbelia rubiifolia*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/793dfdae-f3af-401b-b879-0d994a8802c8