Threatened Species Assessment

Grevillea callichlaena
Benambra Grevillea

Taxonomy

Grevillea callichlaena Molyneux & Stajsic

Current conservation status

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

Proposed conservation status

Critically Endangered in Australia

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

Species Information

Description and Life History

The taxon is a spreading shrub 1.5–1.8(–3) m high, 2–3.5(–4) wide. Branchlets densely subvillous. Leaves entire, ovate, elliptic, broadly-elliptic or broadly lanceolate, narrow obovate to obovate, (26–)37-75(–92) mm long, (12–)19–28(–43) mm wide; upper surface granulose (persistent hair bases), dull, mid-green; margins rolled downward or shortly recurved; lower surface loosely subvillous, lateral veins conspicuous, reticulum conspicuous. Conflorescences terminal, rarely subcauline, decurved to pendulous, simple to 2-branched. Primary peduncles (4–)5–22(–35) mm long, indumentum very densely subvillous; floral rachises (5–)35–50(–65) mm long. Limb of flower buds globose in side view, round face-on, apex obtuse. Limb-segments of tepals (mature pre-anthesis flowers) not keeled along external midline. Dorsal tepals 20.5–22 mm long, 1.9–2.5 mm wide, monochromatic. Perianth outer surface (below limb) red, without central yellow or orange blotch, densely subvillous, epidermis not or only partially visible; perianth inner surface densely bearded near base. Pistil 19.5–22 mm long, ovary stipitate, with occasional, minute, patent, whitish hairs, style red; face of pollen strongly oblique to style, flat to slightly convex. Fruits glabrous or with scattered, minute, patent, whitish hairs when young. Flowers Oct.- Mar., but in the absence of snow can occur sporadically throughout the year. Flowers Oct.- Mar., but in the absence of snow can occur sporadically throughout the year (VicFlora 2017).

G. callichlaena is a large, potentially long-lived shrub of possibly 80-100 years, fire sensitive, and prolifically regenerates by seed post-fire from a soil-stored seed bank of unknown longevity. Flowers are obligately bird pollinated, and the seeds, which ripen 2-3 months after flowering, are passively shed. Secondary seed dispersal of only a few 10s of metres is assumed to be by ants, which bury the seeds after eating the elaiosome.

Generation Length

The generation length of *Grevillea callichlaena* is inferred to be 50 to 80 years. This is based on the typical lifespan of *Grevillea* (N. Marriott pers. comm.), and mode of recruitment.

Distribution

G. callichlaena is confined to the summit area of Mt Benambra in north-east Victoria.

Habitat

The taxon is found on the rocky summit area of Mt Benambra, of Lower Devonian Rhyolite geology, in open shrubby forest dominated by *Eucalyptus pauciflora* at around 1460 m elevation. The soil is heavy skeletal, gravelly rocky brown loam.

Threats

The taxon is threatened by climate change impacts such as decreasing rainfall, increased evaporation, extreme temperatures, and drought, as well as increased frequency and intensity of fire, and unseasonal prescribed fire (especially in winter).

Biotic threats include weed invasion of both native and exotic taxa, *Phytophthora cinnamomi,* and nectar robbing by honeybees, which are ineffective pollinators. A further threat is decreased pollination success as the honeyeater pollinating guild declines because of reduced flowering and fragmented co-occurring floral resources, e.g. *Correa reflexa* var. *speciosa*, *Epacris impressa*, and *Banksia marginata*. Floral resources are majorly affected by increased frequency, intensity, and timing of fires.

Roadworks also have the potential to negatively impact road reserve populations.

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 Endangered

The population reduction over the next 100 years is suspected to be 20 to 50%, based on (c) above.

Future decline is based on the projected impacts of the identified threats, particularly climate change and an altered fire regime.

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 AoO to ensure consistency with the definition of AoO as an area within EoO.

It is estimated to have 1 location as there is only one subpopulation. It has a continuing decline in (i), (iii) and (v) above, based on the impacts of threats currently operating, especially climate change parameters and an altered fire regime.

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 (i), (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 insufficient evidence to determine the number of mature individuals.

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

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Stajsic, V., & Molyneux, W. M. (2006). Taxonomic studies in the *Grevillea victoriae* F. Muell. species complex (Proteaceae: Grevilleoideae) I. Descriptions of nine previously segregated, and three new taxa. *Muelleria*, *22*, 19-76.

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Grevillea callichlaena.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/9f106e0e-190f-4f93-b540-dae84a83cfee