Threatened Species Assessment

Grevillea bedggoodiana
Enfield Grevillea

Taxonomy

Grevillea bedggoodiana J.H. Willis ex McGill.

The flowers change from green to pink at anthesis such that the conflorescence appears bicoloured. It is easily confused with *G. aquifolium, G. obtecta*, and *G. infecunda. G. aquifolium* differs in having a longer pistil 21-26 mm long. *G. obtecta* has conspicuous bracts 5-10 mm long, and *G. infecunda* has a pistil 18-26 mm long, poorly developed anthers, and a sericeous indumentum on the leaf lower surface (VicFlora 2017).

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 2015).

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

Proposed conservation status

Endangered in Australia

Criteria A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a prostrate to procumbent straggling shrub to 0.5 m high. Branchlet indumentum villous, or sometimes subsericeous. Leaves coarsely serrate or dentate to pinnatifid, ovate to oblong or angular-obovate in outline, 2–7 cm long, 1–3.5 cm wide, with 5–9 simple shallow lobes or teeth; lower surface with an open indumentum of curled hairs or occasionally tomentose; margin shortly recurved to almost flat. Conflorescences terminal, erect to decurved, simple, secund to subsecund, (2–)4–6.5 cm long; peduncles 1–10 mm long, (1–)1.2–1.3 mm wide; rachises villous; perianth green becoming pink, outer surface loosely tomentose with a bearded limb, inner surface glabrous; pistil 12–16.5 mm long, ovary stipitate, appressed-villous, style green becoming deep pink, glabrous, pollen presenter oblique. Fruits softly tomentose, usually with longitudinal dorsal ridges and reddish stripes. Flowers October–November (VicFlora 2017).

G. bedggoodiana is a long-lived shrub, monoecious, and a post-fire resprouter. Reproduction is by seed only. Flowers are obligately bird-pollinated by honeyeaters, and it is assumed to be obligately outcrossing. Seeds ripen about 12 weeks after pollination and are passively dispersed from the follicles. Secondary dispersal of seeds is by ants, not more than several tens of metres, which are probably responsible for inhumation of seeds and the formation of soil-stored seedbanks of unknown longevity. Recruitment is continuous but with a marked post-fire pulse.

Generation Length

The generation length of *Grevillea bedggoodiana* is inferred to be 30 to 50 years. This is inferred from other *Grevillea* taxa including cultivated plants, as well as its capacity as a post-fire sprouter.

Distribution

The taxon is confined to the Enfield and Smythesdale areas southwest of Ballarat, particularly in Enfield State Park (Vic Flora 2017).

Habitat

G. bedggoodiana occurs in undulating eucalypt-dominated open forest, or woodland on rocky, gravelly, or sandy clay loam derived from Ordovician sediments. The understorey vegetation is healthy and grassy.

Threats

The taxon is threatened by weed invasion, and decreased pollination success as the honeyeater pollinating guild declines because of reduced flowering and fragmented co-occurring floral resources such as *Correa reflexa* var. *speciosa*, *Epacris impressa*, and *Banksia marginata*. Floral resources are majorly affected by increased frequency, intensity, and timing of bushfires due to climate change, as well as prescribed fires, especially unseasonal prescribed fire in winter. Climatic change will also lead to decreasing rainfall, increased evaporation, extreme temperature, and drought. Other threats include roadworks to road reserve populations, Cinnamon Root-rot Fungus (*Phytophthora cinnamomi*), and nectar robbing by honeybees, which are ineffective pollinators.

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 past 90 to 150 years is inferred to be 50%, based on (c) and (e) above.

Population decline is based on the multiple threats operating on populations, and information from Bill Molyneaux (pers. comm. to D. Cameron).

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 90 to 100 years is suspected to be 30%, based on (c) and (e) above.

Future decline is based on the multiple threats operating on populations.

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 108 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 the AoO as an area within the EoO.

The taxon is inferred to be severely fragmented as lost subpopulations would be unable to recolonise given the very poor seed dispersal of this taxon.

It is inferred to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above in response to climatic threats currently operating on populations.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 108 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (i), (ii), (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:

Ineligible under Criterion C

It is estimated that there are 37,000 mature individuals, which exceeds the thresholds for criterion C.

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 inferred 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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VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Grevillea bedggoodiana*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/412cf739-0470-4023-8f59-fe8f8ad223b7