Threatened Species Assessment

Grevillea polychroma
Tullach Ard Grevillea

Taxonomy

Grevillea polychroma (Molyneux & Stajsic) Molyneux & Stajsic

Grevillea polychroma is very similar to *G. brevifolia*, from which it can be separated by the wide range of flower colour and the shape and orientation of the pollen presenter (VicFlora 2019).

The taxon was briefly known as *Grevillea brevifolia* subsp. 2 (Mt Elizabeth) and as *Grevillea brevifolia* subsp. *polychroma*.

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria A4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a spreading to erect shrub 1-3 m high, 1-5 wide. Branchlets densely subsericeous or subtomentose. Leaves entire, usually obovate, less often elliptic or narrowly elliptic, (12-)25-50(-80) mm long, (10-)33-70(6-)12-24(30.5) mm wide; leaf length to width ratio (2.0:1-)2.3:1-3.0:1(-4.3:1); upper surface glabrous, glossy, mid green; margins tightly and shortly recurved; lower surface moderately densely sericeous or subtomentose, epidermis usually obscured, lateral veins obscure or evident, reticulum absent or obscure. Conflorescences terminal, decurved to pendulous, simple to 3-branched, simple 69 %, 1-branched 26 %, 2-branched 4 %, 3-branched 1 %. Primary peduncles (0-)6-15(-21) mm long, 0.8-1.0 mm wide, indumentum densely subsericeous; floral rachises (11-)14-20 mm(-32) long. Limb of flower buds subglobose in side view, apex obtuse. Limb-segments of tepals (mature pre-anthesis flowers) not keeled or rarely obscurely keeled along external midline. Dorsal tepals (11.2-)17-20 mm long, 1-1.8(-2.0) mm wide. Perianth outer surface (below limb) with epidermis partially visible, densely subsericeous or subtomentose; inner surface glabrous except for beard near base; perianth inner surface creamish, pale yellow, pink, pinkish-red, or red. Pistil 19.2-21.5 mm long, ovary stipitate, glabrous, style creamish, pale yellow, orange, pinkish-red or red; face of pollen concurrent with style, usually flat. Fruits glabrous. The taxon flowers mainly between July and March. In cultivation it can flower sporadically throughout the year (VicFlora 2019).

The taxon is fire-sensitive and killed by intense fires. Reproduction is by seed only from a soil-stored seedbank of unknown longevity. The breeding system is probably substantially outbreeding. Plants are pollinated by honeyeaters, thus gene-flow (via pollen) is limited to a few hundred metres. Seeds are passively shed and secondary dispersal is by ants (myrmecochory), which bury the seeds after eating the elaisome, hence dispersal by ants is only a few tens of metres at maximum.

Generation Length

The generation length of *Grevillea polychroma* is estimated to be 35 to 70 years. This is based on the typical longevity of *Grevillea* plants (Neil Marriott pers. comm.) and inferred fire frequency. The taxon is likely to be an

obligate seed regenerator, recruiting from a soil-stored seedbank. It is inferred to be fire-sensitive, recruiting episodically following major fire events at pre-European settlement intervals of 45-90 years, supplemented by sporadic and opportunistic recruitment in response to localised site disturbance or optimal seasonal conditions. The longevity is likely to be 25-40 years or more, although it is unclear whether the taxon is capable of resprouting following low-intensity fire or intense browsing events.

Distribution

The taxon is endemic to Victoria where it is restricted mainly between Buchan and Gelantipy in East Gippsland. The eastern limit of its known range is in the Brodribb Forest Management Block on the western slopes of the Errinundra Plateau east of Goongerah in the Errinundra National Park, and the western limit is at Seldom Seen near Dargo, a span of about 130 km (VicFlora 2019).

Habitat

The taxon occurs in riparian sites and open woodland to tall open forest on diverse substrates including granite and rhyolite. It has a much broader altitudinal range and ecological amplitude than the similar *G. brevifolia.* It occurs between 80-940 metres above sea level (VicFlora 2019) reaching a maximum elevation of 1100 m in Montane Wet Forest on the slopes of the Errinundra Plateau.

Threats

Key threats include: climate change (decreased rainfall, increased evaporation, extreme temperatures and, for riparian occurrences, extreme rainfall events causing flash floods, soil erosion and/or severe scouring of riparian environments; increased frequency and intensity of fire, inappropriate timing of prescribed fire (winter-spring) and impacts of fire control activities; roadworks, forestry operations; weed invasion; *Grevillea* Leaf Skeletoniser; nectar-robbing by introduced honeybees; targeted browsing and antler rubbing by Sambar; Cinnamon Root-rot caused by *Phytophthora cinnamomi* infection; and decreased pollination success as the guild of honeyeaters declines because of reduced flowering and fragmentation of co-occurring floral resources.

The Victorian Code of Practice for Timber Production 2014 has general prescriptions such as protection and buffering of old growth forests and waterways that provide protection from forestry operations. In recent years, modified harvesting and forest regeneration practices have been implemented in native forest to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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 Vulnerable

The population reduction over the past 105 to 210 years is estimated to be 10 to 30%, based on (c) and (e) above.

Historic habitat loss to agriculture is unlikely to be significant since most records are for public land in state forest or conservation reserves. Some past decline is likely to have occurred in response to the early impact of the identified threats.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is projected to be 30 to 50% (midpoint 40%), based on (c) and (e) above.

This is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 105 to 210 year period, including both past and future (up to 100 years in the future), is estimated to be 40 to 60% (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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 2,263 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the landscape scale. Reproduction is by seed only from a soil-stored seedbank of unknown longevity. The breeding system is probably substantially outbreeding. Plants are pollinated by honeyeaters, thus gene-flow (via pollen) is limited to a few hundred metres. Seeds are passively shed and secondary dispersal is by ants (myrmecochory), which bury the seeds after eating the elaiosome, hence dispersal by ants is only a few tens of metres at maximum.

It is inferred to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the suite of threats.

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, it 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 as Data Deficient

No reliable estimate of the total population size for the taxon is available.

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: 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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Stasjic, V., and Molyneux, W.M. (2005). 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.

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