Threatened Species Assessment

Grevillea dimorpha
Flame Grevillea

Taxonomy

Grevillea dimorpha F. Muell.

G.dimorpha was reduced to one of three subspecies of *G. speciosa*, with *G. oleoides* similarly treated (both the latter are Sydney Basin endemics) (VicFlora 2017).

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria A3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is an erect to spreading shrub to 2 m high. Leaves simple and entire, elliptic to linear or narrowly obovate, 5-15 cm long, 1.5-40 mm wide; lower surface subsericeous; margin recurved or shortly revolute. Conflorescences axillary or cauline, rarely terminal on short lateral branchlets, usually simple; unit conflorescences usually decurved, subsecund; ultimate rachises (1-)2-12 mm long, tomentose to villous or occasionally subsericeous; perianth bright red, outer surface subsericeous to tomentose or loosely so, inner surface bearded; pistil 21-26 mm long, ovary stipitate, glabrous, style bright red, usually with short scattered erect hairs within 1-15 mm from the apex, pollen-presenter oblique. Fruits glabrous. The taxon flowers mainly from August to December (VicFlora 2017).

Generation Length

The generation length of *Grevillea dimorpha* is estimated to be 25 to 50 years. This is based on an estimated longevity of 50 years, and an estimated pre-settlement fire interval of 25-50 years or more. The taxon is likely to be an obligate seed regenerator (OSR). It recruits episodically post-fire, with mass recruitment events greatly outnumbering the contribution of sporadic opportunistic recruitment in response to localised site disturbance or outstanding rainfall events.

Distribution

The taxon is endemic to Victoria and is apparently confined to the central and eastern ranges and valleys within the Grampians National Park. The taxon is concentrated within the Mount William and Serra Ranges, extending from the Halls Gap area in the north, to Mounts Sturgeon and Abrupt near Dunkeld in the south (VicFlora 2017).

Habitat

The taxon is restricted to moister areas of dry sclerophyll forest, or heath on sandy soils over sandstone (VicFlora 2017).

Threats

The taxon is threatened by the current and projected impact of climatic drying and warming. This increases the risk of adult mortality and recruitment failure in response to extreme drought events, which are projected to increase in frequency and intensity. Drought stress is expected to be most acute in stands on skeletal soils in rocky sites, resulting in an anticipated contraction of suitable habitat towards moister deeper soils.

The taxon is also threatened by the increasing frequency of planned burning. The taxon is fire sensitive and is killed by most fire events, with no evidence of root suckering. Like most *Grevilleas*, the taxon germinates in the first 1-3 years following intense fire from a soil-stored seedbank. The taxon often flowers 3-4 years post-fire, but does not reach peak seed production until it is much more advanced. The taxon is therefore an OSR, and is at grave risk of adult mortality, seedbank depletion and exhaustion if subject to repeat fire events at 5 years intervals or less. This is interpreted to be below the tolerable fire interval for the taxon.

Other threats to the taxon include targeted and casual browsing by native and exotic herbivores, such as goats and deer, which threaten stands recruiting post-fire. The taxon is further threatened by poor dispersal, low seed set, and low germinability except immediately post-fire, resulting in a low recolonisation capacity.

Weed invasion by the exotic *Acacia longifolia* (Sallow Wattle) is an increasing threat across the range of the taxon. It is projected to become a major threat, exacerbated by increasing frequency, intensity, and landscape scale of both uncontrolled and imposed fire events.

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 75 to 100 years is projected to be 30 to 65% (midpoint 50%), based on (c) and (e) above.

Future decline is based on the projected impacts of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 75 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 35 to 80% (midpoint 60%), based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Past decline is based on the minor impact of road construction and maintenance, and recreational and strategic infrastructure. More significantly, it is based on the likely early impact of climatic drying and imposed fire regimes, which have been operating for some decades.

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 483 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. Geographically isolated stands occur at separations typically exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal. This precludes the possibility of recolonisation in the event of local extinction.

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

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 88 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 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: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Grevillea dimorpha.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0fd5c804-a455-49c4-a396-9cac1bf261b3