



Goodenia macbarronii Narrow Goodenia

Taxonomy

Goodenia macbarronii Carolin

The distinction between this species and *G. paniculata* is sometimes unclear (at least in Victoria where flowers are reported to be larger than typical for *G. macbarronii*). The variation in characters used to distinguish the two species (flower size, indusium size, shape and coloration) seems almost continuous. Generally, the leaves of *G. macbarronii* are narrower, thicker and less distinctly toothed than those of *G. paniculata* but exceptions exist. A chromosome count of $n = 8$ for *G. macbarronii*, compared to $n = 16$ for *G. paniculata*, suggests that they are reliably distinct, but sampling for each is limited, and polyploid series are known within some species (e.g., *G. pinnatifida*) (VicFlora, 2018).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1992).

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

Proposed conservation status

Endangered in Victoria

Criteria A2ce+3ce+4ce; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is an erect perennial to 40 cm high, often with adventitious roots; stems glabrous. Leaves mostly basal, linear-oblongate, 5-11 cm long, 2-6(-8) mm wide, acute, thick, glabrous, margins entire to bluntly-toothed, base attenuate into an indistinct petiole. Inflorescences terminal racemes or thyrses to 25 cm long, much longer than leaves; pedicels articulate, 0.5-3 mm long; bracteoles linear, 2-4 mm long. Sepals linear to elliptic, 1-2(-3) mm long; corolla 7-9(-13) mm long, with glandular and simple hairs outside and inside, yellow, abaxial lobes 4-4.5 mm long, wings c. 1 mm wide; indusium rectangular to squarish, flat-topped or concave dorsally, purplish at least towards apex, sometimes throughout; ovules numerous. Fruit subglobose to ovoid, 3-4 mm long, valves entire; seeds suborbicular, c. 0.5 mm diam., pitted, yellow-brown, wing vestigial, pale. The taxon flowers mainly from October to March (VicFlora, 2018).

Generation Length

The generation length of *G. macbarronii* is estimated to be 50 to 80 years. Longevity is potentially indefinite, with established plants vegetatively resprouting from an extensive rhizome system. Field observations suggest seed recruitment is rare or sporadic and not readily evident in the field. Natural mortality is probably very rare, possibly only in extreme prolonged drought periods.

Distribution

The taxon is rare in Victoria where it is apparently confined to areas between Wedderburn and Moyhu in the north-east and north to the Murray River. The taxon also occurs in New South Wales (VicFlora, 2018).

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Major concentrations of occurrences are in the Euroa, Wangaratta and Chiltern districts in the North East region, with a western outlier in the Kooyoorra State Park west of Inglewood and south of Wedderburn.

Unvouchered site records in the Victorian Biodiversity Atlas (VBA) suggest the taxon also occurs in the Werribee district west and south-west of Melbourne, and field observations suggest the taxon also occurs on the Patho Plains west of Echuca and north of the Kamarooka towards Terrick Terrick.

Habitat

This taxon is apparently confined in Victoria to forests and grassy areas, usually in damp, sandy, or silty soils. It is sometimes recorded from seepage areas below farm dams (VicFlora 2018).

The taxon is a habitat specialist, with core habitat across the North East region being Spring Soak Wetland, whereas on the Northern Plains the core habitat is more fertile gilgai depressions in Plains Grassy Wetland.

Threats

The taxon has undoubtedly suffered significant historic decline through habitat loss to intensive agriculture, and habitat modification through low intensity agricultural activity across its apparently restricted range.

The wetland habitat of the taxon is particularly susceptible to hydrological modification in response to climatic drying, with reduced reliability of spring-fed waters to sustain Spring Soak Wetlands.

The taxon is also threatened by weed invasion since most sites occur in fragmented rural landscapes where they are exposed to a range of edge effects. A significant proportion of known occurrences are on roadside drains or other equally insecure sites at existential risk of elimination through stochastic land management activities, including roadside management, fire break construction including mineral earth breaks, and agricultural intensification.

The taxon is also threatened by targeted browsing by native and exotic herbivores, agistment of stock on road reserves, by pugging of its habitat by stock, and increasingly by deer, including Sambar deer.

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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> <p>based on any of the following:</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 150 to 240 years is estimated to be 30 to 80% (midpoint 50%), based on (c) and (e) above. Past decline is based on the past impact of the identified threats.

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is projected to be 30 to 80% (midpoint 50%), based on (c) and (e) above. Future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 150 to 240 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 80% (midpoint 50%), based on (c) and (e) above.

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

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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 332 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the regional scale, and both naturally and anthropogenically at the landscape scale. All occurrences are isolated from each other at separations greatly exceeding the dispersal range of the taxon, which is at the metre scale since it has no specialised mechanism for long-distance dispersal.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of climatic drying, weed invasion and other edge effects.

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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 no available estimate of current population size.

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 km ² 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.

SAC (1992). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 193 *Goodenia macbarronii*.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Goodenia macbarronii*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/cab83832-cf35-4e44-850b-7f08a08d70c4>