

Boronia galbraithiae Aniseed Boronia

Taxonomy

Boronia galbraithiae Albr.

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 1994). Categorised as Vulnerable in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

Proposed conservation status

Critically Endangered in Australia

Criterion B1ab(iii)

Species Information

Description and Life History

The taxon is a glabrous shrub to c. 2 m high, fennel-scented; branches 4-angled with glandular-warty decurrencies. Leaves pinnate with 3-17 leaflets, to 25 mm long; leaflets oblanceolate to narrowly obovate, 2-9.5 mm long, 1-3 mm wide, obtuse to subacute, apiculate, slightly discolourous, margins flat and glandular-serrulate. Inflorescence axillary, (1-)3-5(-15)-flowered; peduncle 5-12 mm long; pedicel 2.5-7 mm long. Sepals ovate-deltoid, 1-2 mm long, imbricate, glabrous; petals 4.5-8 mm long, white to deep pink, imbricate, midrib not raised, deciduous; stamen filaments pilose; style glabrous, c. same length as globular stigma. Follicles glabrous, c. 4 mm long; seeds 2-2.5 mm long, black, shiny. The taxon flowers in spring (VicFlora 2016).

The taxon can be distinguished from the widespread, co-occurring *Boronia muelleri* by its smaller stature and its leaflets that are: shorter (less than 10 mm long), elliptic (compared to oblanceolate) and have toothed leaf margins (rather than smooth). Following fire, the taxon regenerates from rootstock and germinates from seed (TSSC 2016).

Generation Length

The generation length of *Boronia galbraithiae* is inferred to be 25 to 50 years. This is based on a likely pre-settlement fire frequency of one wildfire per 25 year interval and the likelihood that the taxon is pulse recruited by intense wildfire. It is also based on a plausible longevity of 15-35 years and the expectation that a soil-stored seed bank is capable of surviving beyond the longevity of each cohort of mature individuals. The generation time and longevity may be extended by resprouting from the rootstock which has been observed following at least some fire events.

Distribution

The taxon is a Victorian endemic and it is only known from Briagolong State Forest, 200 km east of Melbourne, in the South East Coastal Plain IBRA bioregion (TSSC 2016). It is located between Stockdale and Dargo (DSE 2009; VicFlora 2016). Carter and Walsh (2006) identify a total population of 3000 plants in three populations. These populations are at Insolvent Track (southern population) (300-500 plants); Insolvent Track (northern population) (2000 plants); and Howards Road (400 plants). There is possibly a fourth subpopulation based on the 1994 R.J. Fletcher specimen collected on Jerry Rd 3.5 km east from Mt Difficulty.



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There is little information on the former distribution, nor is it known if the taxon has suffered a decline in range or abundance (TSSC 2016).

Habitat

The taxon occurs in elevated, dry open-forest sites on skeletal spurs and upper slopes and a rocky streamside locality (DSE 2009; VicFlora 2016).

The taxon tends to prefer moister and more sheltered habitat. It occurs in tall open sclerophyll forest at altitudes of 210-540 m above sea level. The largest subpopulation occurs on a dry ridgetop on skeletal soils, while the other two subpopulations occur in subriparian and moist forest habitat. The forest where it occurs is usually dominated by *Eucalyptus sieberi* (silvertop ash), with the co-dominants *E. muelleriana* (yellow stringybark), *E. cypellocarpa* (mountain grey gum), *E. polyanthemos* (red box) and/or *E. dives* (broad-leaved peppermint). Associated substrata species typically include, but are not restricted to, *Acacia obliquinervia* (mountain hickory wattle), *Dampiera stricta*, *Daviesia latifolia* (hop bitter-pea), *Hibbertia riparia* (stream Guinea-flower), *Joycea pallida* (red anther wallaby grass) and *Pultenaea scabra* (rough bush-pea). Many other shrubs and herbaceous plants are also usually present (TSSC 2016).

Threats

Threats to the taxon include inappropriate fire regimes, the risk of recruitment failure due to native and exotic browsers, and the increasing risk of extreme drought stress, as well as a moderate to high risk from stochastic events, such as roadworks and fire management activity.

Potential future threats to the taxon include too frequent fire (i.e. does not allow plants to sexually mature and replenish the seed bank and may cause local extinction) and too intense fire (i.e. may destroy seed, reducing regeneration success following fire), road maintenance (i.e. populations adjacent to roads or tracks may be at risk of mortality, such as at Howards Road), and localised distribution (i.e. a large stochastic event could destroy all populations) (DSE 2009; TSSC 2016)..

The taxon is known only from one very small area in central Gippsland. Forestry operations may have contributed to past decline, but as there is no information on past distribution or abundance, and no evidence of any declines in existing populations, it is not possible to determine if the taxon has suffered any decline in range and/or abundance. Threats are generally rated as low, with populations most at risk from inadvertent damage. Given the very limited distribution and low numbers of plants, the risk from stochastic events is probably moderate to high (Carter & Walsh 2006).

Spatial analysis of likely habitat for Aniseed Boronia indicates that 62% occurs within the CAR reserve system, including parks and reserves, special protection zones and areas excluded from harvesting by prescription under the Victorian Code of Practice for Timber Production 2014 (the Code). Species-specific protections for Aniseed Boronia are included in the Code in Gippsland FMAs. Other more general prescriptions also provide protection from timber harvesting.

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> <ul style="list-style-type: none"> (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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 16 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Area of Occupancy (AoO) to ensure consistency with the definition of AoO as an area within the EoO.

The taxon is severely fragmented naturally at the landscape scale with no dispersal mechanism other than the possibility of ant dispersal at the metre scale.

It is estimated to have 1 location, All key identified threats apply across the range of the taxon and can rapidly affect all individuals of the taxon present.

. It has a continuing decline in (iii) above, based on the identified threats, including inappropriate fire regimes, native and exotic browsers, the increasing risk of extreme drought stress, as well as a moderate to high risk from stochastic events, such as roadworks and fire management activity.

Eligible under Criterion B2 as Endangered

The AoO across the taxon's range is estimated to be 16 km², based 2 x 2 km² grids derived from on accepted, post-1970 records from the VBA. As above, the taxon is severely fragmented, has 1 location and a continuing decline in (iii) above.

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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

It is estimated that there are 2,700 to 2,900 mature individuals, but other thresholds under this criterion have not been met.

Criterion D. Very small or restricted populations		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 D 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

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