Threatened Species Assessment

Boronia algida
Alpine Boronia

Taxonomy

Boronia algida F. Muell.

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criterion B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C1

Species Information

Description and Life History

The taxon is a usually a spreading shrub to c. 60 cm high, less often erect to 1 m high, glabrous to moderately simple hairy throughout; branches obviously glandular, often dichotomous. Leaves pinnate with (3-)5-9 leaflets, 8-15 mm long, 4-5 mm wide; leaflets obovate, 2-9 mm long, 1-4.5 mm wide, obtuse to obcordate, margins flat, entire, midrib not raised abaxially, terminal leaflets shortest; petiole 0.5-1 mm long. Inflorescence terminal, 1(-3)-flowered; peduncle usually absent; pedicel 0.5-5 mm long. Sepals broadly ovate-deltoid, imbricate, ciliate, 1-2.5 mm long; petals pink or white, valvate, midrib not raised abaxially, 4-7 mm long, glabrous, 2.5-3 mm wide, persistent; staminal filaments glabrous; style glabrous, stigma globular, often concealing style. Follicles 2.5-3 mm long; seed 2-2.5 mm long, grey to black, dull, smooth. The taxon flowers mostly from November to February (VicFlora 2020).

Generation Length

The generation length of *Boronia algida* is estimated to be 30 to 50 years. Fire is historically rare in alpine ecosystems, occurring perhaps once or twice a century and, on average, perennial shrubs and herbs are likely to reach the end of their reproductive life prior to another fire. In undisturbed vegetation, the average plant age is likely to be at the older end of the estimated lifespan, reflecting the recruitment pulse after fire and lower-level recruitment thereafter.

Distribution

The taxon occurs in Mt Buffalo, Mt Hotham, Nunniong Plateau and nearby areas. It also occurs in NSW and ACT (VicFlora 2020).

Habitat

The taxon is mostly found on shallow soils derived from igneous parent rock, occurring in heath or open eucalypt woodland communities (VicFlora 2020).

Threats

The bushfires of 2019/2020 are believed to have impacted around 16% of the taxon's modelled habitat as of early January 2020. The overall impacts of the fire are yet to be determined.

Alpine taxa are prone to range contraction due to climate change, of which the impacts are likely to be seen first in marginal, lower-elevation subpopulations. Large fires are becoming more frequent and two fires at a short interval will be particularly detrimental to the taxon. The increasing impacts of feral horses and deer might be countered in some areas by recovery from cattle grazing.

The taxon is likely to be threatened by feral herbivores, notably Sambar Deer and soil and vegetation disturbance as a result of fire recovery activities (e.g. machinery impacts, removal of hazardous trees). Drought, hot weather and repeat fires have the potential to damage or destroy recovering plants and/or seedlings. The taxon's recovery depends on the effective control of the impacts of herbivores and by preventing soil disturbance following fire recovery.

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:

Ineligible under Criterion A

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

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 B as Vulnerable

The Extent of Occurrence (EoO) is estimated to be 7,696 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) across the taxon's range is estimated to be 156 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

Subpopulations on the Nunniongs, Hotham/Falls Creek areas, Bogong High Plains, Mt Buffalo, and Snowy Range area may be variably affected by bushfire or stochastic events, therefore, there can be considered to be four (if a large-scale bushfire) to seven locations.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats, including the impacts of feral animals, inappropriate fire regimes, and the likelihood of an increasing frequency and intensity of bushfires due to climatic warming and drying.

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:

Eligible under Criterion C as Vulnerable

It is estimated that there are 2,500 to 5,000 mature individuals. There are approximately 50 distinct records for this taxon in the VBA with an estimated 50 to 100 plants per record. Where recorded herbarium notes indicate plants as common or scattered, MEL 2338187 notes a population size of 'about 50 plants scattered over about 1 hectare'. Other general observations note that the plants form fairly discrete populations of tens rather than hundreds of plants.

There is an estimated continuing decline in the number of mature individuals of 20% within three generations.

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:

Ineligible under Criterion D

It is estimated that there are 2,500 to 5,000 mature individuals.

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 (2020). Flora of Victoria, Royal Botanic Gardens Victoria: *Boronia algida*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/35c75a7b-d6d5-4316-b199-ecf35a8fc099