

Bossiaea bracteosa Mountain Leafless Bossiaea

Taxonomy

Bossiaea bracteosa F. Muell. ex Benth.

In 2009 Keith McDougall (2009) described four new species related to *Bossiaea bracteosa*. All four are highly localised endemics, three of which, *B. bombayensis*, *B. fragrans* and *B. milesiae*, are currently known only in New South Wales. The fourth, *B. grayi*, is currently known only in the ACT and in the Cobberas district in far East Gippsland. Following the segregation of these four species, *B. bracteosa* is now considered a Victorian endemic.

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

Species Information

Description and Life History

The taxon is a rigid, dense, often extensively root-suckering shrubs to 2 m high, more or less glabrous; main stems terete, branches flattened and winged, ultimate branches of cladodes 5-14 mm wide, with a relatively deep recession at nodes, often with a white waxy surface that exfoliates when the branches dry. Leaves reduced to scales 3-5 mm long, 1-2.5 mm wide from midrib to margin, venation conspicuous. Flowers usually solitary, 8-10 mm long; pedicels 1-3 mm long; bracts several, conspicuous, reddish-brown, distichous, c. 2 mm long, persistent; bracteoles obscure, soon deciduous; calyx 4-5 mm long, glabrous; standard deep yellow, often suffused with red externally, longer than other petals; ovary shortly stipitate, glabrous, 6-8-ovuled. Pods oblong, 2.5-4.5 cm long; stipe c. equal to calyx. The taxon flowers from November to December (VicFlora 2018).

The taxon is distinguished from most of the other leafless species by having conspicuous large deciduous scarious scales at the nodes, cladodes with relatively broad ultimate branches, flowering pedicels shorter than or scarcely exceeding bracts, and soon-deciduous bracteoles. Flowers of Fabaceae species are visited by insects, but longer distance pollination is likely to be through birds, which disperse for around 5 km (sometimes up to 12 km) (Byrne et al. 2007).

It is very likely to be rhizomatous and suckering, from specimens collected by Neville Walsh, in particular NGW 8888 – "loosely matting perennial herb growing beside path under light shade".

Generation Length

The generation length of *B. bracteosa* is estimated to be 40 to 120 (midpoint 80) years. This is based on the reported ability of the taxon to sucker extensively from the root system (VicFlora 2018). This suggests the taxon is a facultative resprouter capable of surviving rare fire events without relying on seed recruitment from a soil-stored seedbank which is the case for an obligate seed regenerator. Nevertheless, Auld (1996) confirmed that *B. bracteosa* has fire-stimulated seedling recruitment from hard seeds, while the ACT Government (2012) suggested that the similar *B. grayi* is intolerant of plant-plant competition. Fire is historically rare in alpine ecosystems,



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occurring perhaps once or twice a century and, on average, perennial shrubs are likely to reach the end of their reproductive life prior to another fire.

Distribution

The taxon has a restricted distribution and is known in Victoria from very few plants in the alps (VicFlora 2018). It has been recorded from localities including the Black Range, southern Dargo High Plains, near Mt Howitt, between Mt Hotham and Mt St Bernard, and north-west of Maffra.

Habitat

The taxon is found in drier upper montane to subalpine forest or subalpine woodland, where it is almost entirely recorded in Snow Gum (*Eucalyptus pauciflora*) woodland, rarely with Alpine Ash (*E. delegatensis*), and rarely extending above the tree line at Mt Hotham to 1565 m elevation. Many sites are basaltic, suggesting grassy habitats likely to experience more frequent but less intense fire in landscapes prone to lightning-strike fires. The habitat in the Black Range, Mt Buffalo and Mitta Mitta localities is unknown, and the taxon is likely to be locally extinct in these districts.

Threats

Historic records in some localities suggest at least a proportion of subpopulations have become locally extinct, since recent fire events in well monitored areas such as Mt Buffalo have failed to relocate historic occurrences, implying seedbanks at these sites are long exhausted. Historic threats, ranked in order of significance are: stochastic events, high intensity fire, climatic drying and warming, stock grazing and weed invasion by, for example, Blackberry (*Rubus anglocandicans*) on basalt, and other exotics in grassy habitats. Graziers maintained high fire frequency for green pick at lower elevation sites such as Mitta Mitta and the Black Range.

All these threats continue to operate with key current and projected threats, ranked in order of significance, including targeted browsing by Sambar deer (*Cervus unicolor*), repeat fire events, recruitment failure in response to targeted post-fire herbivory and extreme drought stress, and in some sites, competition from weeds. Some occurrences may be threatened by track and other infrastructure maintenance including snowfield development.

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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:

Eligible under Criterion A2ce as Endangered

The population reduction over the past 120 to 360 years is estimated to be 20 to 60% (midpoint 40%), based on (c) and (e) above.

An estimate of past decline is based on the impact of the identified historic threats.

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

Eligible under Criterion A3ce as Vulnerable

The population reduction over the next 100 years is projected to be 20 to 45% (likely 40%), based on (c) and (e) above.

An estimate of future decline is based on the projected impact of the identified current and future threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 120 to 360 year period, including both past and future (up to 100 years in the future), is inferred to be 40 to 80% (midpoint 65%), based on (c) and (e) above.

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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 96 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is severely fragmented, since it occurs in at least eight geographically discrete localities and has no special mechanism for long distance dispersal, the key vector of seed being ants (myrmecochory) which operate at the metre scale.

A single location is identified since the key current and future threats operate consistently across the geographic and ecological range of the taxon.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

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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:

Eligible under Criterion C as Vulnerable

It is estimated that there are 2,000 to 20,000 mature individuals. The upper bound is estimated from cover/abundance data for the taxon, which varies from less than 1% to occasionally 26-50%. Assuming an average of 3% cover (equivalent to solid cover of 12 m² over a standard 20 x 20 m quadrat), and a density of around 25 ramets per square metre. Assuming that the 76 VBA records represent most of the population, then the total number of ramets is likely to be at least 20,000, albeit with considerable uncertainty. Since the taxon is reported to be extensively root suckering (VicFlora 2018), this estimate of ramet number is likely to greatly over-estimate the number of genets or individuals, hence the lower bound estimate is an order of magnitude lower.

There is a projected continuing decline of 20 to 45% (midpoint 30%) over three generations.

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 D2 as Vulnerable

The taxon is very restricted, with a single location, such that this restriction makes the taxon capable of becoming critically endangered or even extinct within a time period of one or two generations, in response to the projected impact of the identified threats.



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Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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