Threatened Species Assessment

Bossiaea ensata
Sword Bossiaea

Taxonomy

Bossiaea ensata Sieber ex DC.

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 D2

Species Information

Description and Life History

The taxon is an erect or procumbent shrub, usually less than 1 m high, more or less glabrous; stems and branches flattened and winged, often weak and supported by surrounding vegetation, ultimate branches of cladodes 2-7 mm wide. Leaves reduced to scales to 2 mm long, occasionally with a few ± rotund leaves to 15 mm long on basal or juvenile growth. Flowers solitary, 6-10 mm long; pedicels to 4 mm long; bracts few, to 2 mm long; bracteoles inserted at or below middle of pedicel; calyx 3-4 mm long, glabrous; corolla yellow and red, the standard longer than other petals; ovary shortly stipitate, glabrous, 6-8-ovuled. Pods oblong, densely pubescent, to 4 cm long; stipe about as long as the calyx. The taxon flowers from September to October (VicFlora 2019).

Generation Length

The generation length of *Bossiaea ensata* is suspected to be 30 to 50 years. It is difficult to estimate since it is unclear whether the taxon has any resprouting ability or whether it is an obligate seed regenerator (OSR), recruiting predominantly post-fire. Any OSR would be at a disadvantage in a habitat strongly dominated by strong resprouters, with relatively few OSRs. The taxon is therefore inferred to be likely to resprout following fire. Therefore, the longevity plausibly exceeds the mean pre-settlement fire interval, which is estimated to have been 30-50 years within the habitat range of the taxon. Depending on the taxon's resprouting ability, the generation time is arguably 30-50 years or more.

Distribution

In Victoria, the taxon is restricted to East Gippsland, where it is occasional eastward from about Marlo. Specimen records in the Australian Virtual Herbarium (AVH) suggest a major discontinuity between Bemm River and the Benedore River. However, this apparent discontinuity is only partial since the Victorian Biodiversity Atlas (VBA) includes several scattered site records between Tamboon Inlet and the lower Thurra River, and between Wingan Inlet and the Benedore River. The taxon also occurs in Qld and NSW (VicFlora 2019).

Habitat

Quadrat data indicate that habitat range includes wet peaty heath and drier coastal heathland, with numerous quadrats including elements of both extremes. This suggests that the taxon is somewhat ecotonal between wet peaty heath and drier coastal heathland, including low to tall heathland and even heathy woodland with *Banksia serrata* and occasional eucalypts. VicFlora (2019) notes that the taxon is occasional on sandy soil.

Threats

Given the ecotonal habitat range of the taxon, the key threats, which apply to wetter habitats, are unlikely to lead to local extinction. These include repeat intense fire event with the risk of substrate destruction. It is therefore difficult to argue that the taxon is subject to continuing decline in habitat quality based on climatic drying and increasing frequency and severity of fire, including imposed inappropriate fire regimes.

In the longer term, however, the taxon is projected to be at increasing risk from extreme drought stress, repeat fire events and catastrophic fire consuming peaty substrates at the wetter end of the habitat range.

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

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 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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,295 km² and the Area of Occupancy (AoO) is estimated to be 108 km², but other thresholds under this criterion have not been met.

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 population size for the taxon, although it is suspected that it may exceed the threshold of 1000 mature individuals.

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. It has a restricted distribution because it is estimated to occur in 1 to 2 locations, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct with a time frame of one or two generations, in response to the identified threats to hydrological stability.

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 (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Bossiaea ensata*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/9d90a5d7-3969-4c48-ba0e-a29961f28e79