Threatened Species Assessment

Cassinia diminuta
Dwarf Cassinia

Taxonomy

Cassinia diminuta Orchard

The taxon was previously included under *C. uncata* (VicFlora 2018).

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 A2bce+4bce; B1ab(iii,iv,v)+2ab(iii,iv,v)

Species Information

Description and Life History

The taxon is an erect aromatic subshrub (0.3-)0.5-0.7(-1.0) m high; branchlets with dense spreading aculeate hairs or sparse cottony hairs in axils and young growth, viscid. Leaves spreading, sessile, terete, 5-18(-30) mm long, 0.7-1 mm wide, glabrous or with sparse minute conical hairs above, dense white cottony hairs beneath except for midrib, apex reflexed at 45-90? with a short mucro, margins revolute to midrib. Inflorescences corymbose, 1-8 cm diam. Capitula (20-)70-200, white with greenish base, 5-angled, conical, 2.5-2.8(-3.0) mm long, c. 1.5-3 mm wide. Involucral bracts 15-25, 5-ranked, innermost with lamina deltoid, c. 1.0 mm long, erect, white to greenish; margin entire, incurved. Receptacle bracts 1 or 2. Florets 5 or 6 (rarely 7). Cypsela oblong to obconical, (0.8-)0.9-1.1 mm long, glabrous or with sparse subsessile globular hairs (mainly towards apex); pappus bristles 1.5-2.0 mm long (VicFlora 2018).

The buds are present from December, flowers from late January to March, and fruits from March to May (Orchard 2004).

Generation Length

The generation length of *Cassinia diminuta* is inferred to be 50 to 100 years. This is based on pre-settlement fire frequency being plausibly only once or twice per century, the observation that lightning strike fires are rare and rarely spread and persist, the inference that post-fire seed recruitment is the dominant mode of recruitment at the time of settlement with a low level of continuous recruitment in response to localised soil disturbance, an assumed long persistent soil seed bank, and the observation that the closely related *C. sifton* can survive for at least 50 years in long unburnt vegetation.

Distribution

The taxon is very common in the low mallee of the Whipstick and Kamarooka Forests near Bendigo, with very sparse outliers in Ironbark (*Eucalyptus tricarpa*) forest near Rushworth. There are two old collections from Kerang (VicFlora 2018; Orchard 2004).

Habitat

The taxon is a subshrub of the understorey of eucalypt woodland or mallee, on sandy clay soils, often with ironstone shards. In the Whipstick/Kamarooka area near Bendigo it is abundant in mallee vegetation dominated by *Eucalyptus behriana*, and also in the occasional stands of Ironbark woodland. The taxon is sporadic and locally occasional in the understorey of Ironbark open woodland, south of Rushworth in Rushworth State Forest (VicFlora 2018; Orchard 2004).

Threats

The overriding current threat to the taxon is planned burning. Whilst planned burning is expected to maintain recruitment, post fire recruitment in some sites is observed to be highly compromised by poor rainfall conditions, and is projected to become more frequent with climatic drying resulting in increasing risk of recruitment failure. Permanent fire breaks, such as large swathes across the Whipstick Forest from west to east more than 100m wide, are planned to be burnt at frequencies likely to exceed the minimal tolerable fire interval for the taxon. The taxon is therefore confidently subject to inferred and projected continuing decline in quality of habitat across the entire range, based on the combination of imposed fire regime and climate drying.

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:

Eligible under Criterion A2 as Endangered

The population reduction over the past 150 to 300 years is estimated to be 50 to 75%, based on (b), (c) and (e) above.

Past decline is based on the high level of historic habitat loss (85%) of Box Ironbark Forests in Victoria to agricultural clearance and settlement.

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

Eligible under Criterion A4 as Endangered

The population reduction over any 150 to 300 year period, including both past and future (up to 100 years in the future), is projected to be 50 to 75%, based on (b), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

The magnitude of future decline cannot be estimated with any confidence since decisions regarding fire management and the frequency, intensity and duration of extreme climatic events cannot be predicted.

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 B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4,784 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, because each subpopulation is typically isolated from other occurrences at distances exceeding the dispersal range of the taxon. Therefore the probability of recolonisation, in the event of local extinction, is remote.

It is estimated to have 1 location, and has a continuing decline in (iii), (iv) and (v) above, based on the combined impact of planned burning, fire break construction and maintenance, climatic drying, stochastic events, road maintenance, and extractive activities.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 188 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA

As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (iii), (iv) and (v) above.

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

No reliable estimate of the total population size for the taxon is available.

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.

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

Orchard, A.E. (2004). A revision of *Cassinia* (Asteraceae: Gnaphalieae) in Australia. 2. Sections Complanatae and Venustae. *Australian Systematic Botany, 17*(6), 505-533.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Cassinia diminuta.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/13337a29-d853-4786-a3f2-0edb73df133e