

## *Cassinia ozothamnoides* Cottony Cassinia

### Taxonomy

*Cassinia ozothamnoides* (F. Muell.) Orchard

*C. ozothamnoides* was previously included in *Haeckeria*. However, the presence of pappus bristles on some florets and bumps indicating the position of aborted pappus bristles on others, supports removal of this taxon from *Haeckeria*. Its inclusion in *Cassinia* is warranted based on the presence of receptacle bracts between the florets (Orchard 2004a). It was also found to be nested within *Cassinia* in molecular phylogenetic analyses (Schmidt-Lebuhn and Constable 2013), supporting its inclusion in *Cassinia*.

The Victorian taxa *C. scabrida* and *C. venusta* were once included within a broader circumscription of *C. ozothamnoides* (as *Haeckeria ozothamnoides*), but are distinguished from *C. ozothamnoides* based primarily on leaf and stem indumentum. These indumentum characters show little or no overlap between taxa (VicFlora 2017).

### Current conservation status

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

### Proposed conservation status

Endangered in Victoria

Criterion A2ce+3ce+4ce; B2ab(i,ii,iii,iv,v); C2a(i)

### Species Information

#### Description and Life History

The taxon is an erect shrub to 2 m high; branchlets with dense white woolly hairs with occasional weak emergent spreading transiently gland-tipped hairs, ribbed by decurrent midribs and margins. Leaves erect to spreading, sessile, linear, (10-)20-30(-55) mm long, 1(-2) mm wide, upper surface dark green, obscured by white woolly hairs when young, lower surface densely white woolly, apex acute with a reflexed mucro, margin revolute. Inflorescences corymbose or hemispherical, (3-)5-9 cm diam. Capitula 50-200, straw-coloured, cylindric, (3-)4-5 mm long, c. 1-2 mm wide; involucral bracts 12-18, innermost linear-oblong with lamina narrow-triangular, c. 1.5-2 mm long, erect, flat, hyaline, margin entire to erose; receptacle bracts usually 2; florets 5-6. Cypsela cylindric, (0.8-)1.0-1.2 mm long, sparsely papillose; pappus absent or 1-16 bristles, 1.5-1.8 mm long. The taxon flowers from October to March (VicFlora 2017).

#### Generation Length

The generation length of *Cassinia ozothamnoides* is estimated to be 20 to 50 years. *C. ozothamnoides* is inferred to recruit episodically in response to fire, drought-breaking rains, or localised soil disturbance events. The recommended interval for high severity fires in Box-Ironbark forest is between 30 and 150 years, and more frequently, down to every 12 years for low severity fires (Cheal 2010). Estimates of generation time reflect the plausible pre-settlement fire intervals across the range of the taxon, and the likelihood that some opportunistic recruitment also occurs in response to localised disturbance events such as animal digging or targeted browsing. Longevity may exceed 50 years, although for most individuals longevity is likely to be in the 15-35 year range.

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### Distribution

The taxon is apparently endemic to Victoria, where it is presently confined to the northern watershed of the Dividing Range in north-eastern Victoria, spanning the Midlands and Riverina districts, from Avenel to Chiltern and north to Boweya. Older collections (80 or more years old) indicate a former distribution across northern and central Victoria as far as Dookie, Bendigo, Daylesford, Castlemaine and Mt Alexander (Orchard 2004).

### Habitat

*C. ozothamnoides* is an uncommon pioneer taxon of disturbed sites in dry open-forests on poor shaly or stony soils (VicFlora 2017). The taxon has an altitudinal range from 170 m to approximately 400 m (Orchard 2004).

### Threats

The taxon is likely to have suffered severe historic decline through habitat loss to agriculture, as suggested by its apparent extinction from a number of outlying sites where known only by older collections, for example Dookie, Daylesford, Castlemaine and Mt Alexander (Orchard 2004). Although Ern Perkins recorded a single plant at Mt Alexander in the early 1980s, the taxon has not been recorded at this site since. Ern Perkins suspects heavy browsing during drought by wallaby, hare, rabbit, goat, and sheep have contributed to the local extinction of the taxon at many sites. The impact of rabbit browsing may be constrained, however, by the resinous foliage of the taxon.

Current threats include incremental habitat loss through agricultural intensification, weed invasion, soil compaction and erosion, browsing by cattle, sheep, wallabies, kangaroos, goats, rabbits, hares, and feral deer. Extreme and prolonged drought stress is likely to be an increasing threat, resulting in reduced seed set, adult mortality, recruitment failure, and local extinction.

### 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> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

**Evidence:**

**Eligible under Criterion A2 as Endangered**

The population reduction over the last 60 to 150 years is estimated to be 30 to 80% (midpoint 50%), based on (c) and (e) above.

Past decline is based on the historic impact of the identified threats.

**Eligible under Criterion A3 as Endangered**

The population reduction over the next 60 to 100 years is projected to be 30 to 80% (midpoint 50%), based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats.

**Eligible under Criterion A4 as Endangered**

The population reduction over any 60 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 80% (midpoint 50%), based on (c) and (e) above. The causes of reduction may not have been ceased, be understood or be reversible.

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 <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 Vulnerable**

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 10,780 km<sup>2</sup>, based on accepted, post 1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale, with many occurrences likely to be isolated at distances exceeding the dispersal range of the taxon.

It is estimated to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

**Eligible under Criterion B2 as Endangered**

The Area of Occupancy (AoO) across the taxon's range is estimated to be 92 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

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As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (i), (ii), (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:

#### Eligible under Criterion C2 as Endangered

It is estimated that there are 500 to 850 mature individuals. Orchard (2004) noted that the largest known subpopulation near Avenel comprised between 200 and 300 plants. All other subpopulations do not extend as far as this subpopulation (they extend up to around half the area of the largest subpopulation) and records from these subpopulations occur less frequently suggesting that plants are more sparsely distributed at these other sites. An estimate of 30-50 plants is given for these 10-11 subpopulations, to which is added the 200-300 for the largest subpopulation, resulting in a current estimate of between 500 and 850 mature individuals.

There is an estimated continuing decline, and there are 200 to 300 mature individuals in the largest subpopulation.

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 <sup>2</sup> or number of locations ≤ 5

### Evidence:

#### Eligible under criterion D as Vulnerable

It is estimated that there are 500 to 850 individuals, and the taxon is very restricted.



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

## References

- Cheal, D. (2010). *Growth stages and tolerable fire intervals for Victoria's native vegetation data sets*. Fire and adaptive management report No. 84. Department of Sustainability and Environment, East Melbourne, Victoria, Australia.
- DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.
- Orchard, A.E. (2004). A reassessment of the genus *Haeckeria* (Asteraceae: Gnaphalieae), with definition of new species in *Cassinia*. *Australian Systematic Botany* 17: 447-467.
- VicFlora (2017) Flora of Victoria, Royal Botanic Gardens Victoria: *Cassinia ozothamnoides*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/3caa7a03-1976-46cf-a47f-adc3e1b1eae1>