Threatened Species Assessment

Brachyscome radicans
Marsh Daisy

Taxonomy

Brachyscome radicans Steetz

This is a variable species, particularly regarding the absence or presence and size and number of tubercles on the lateral faces of the cypselas (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 Victoria

Criteria B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a creeping glabrous perennial. Leaves mainly in near-basal clusters, linear, entire or 3- or 4-lobed, entire leaves 2-13 cm long, 0.5-3.5 mm wide, margins scarious, bases dilated. Peduncles 1 per tuft, 8-16 cm long, with 1 or 2 linear leaves usually in the lower half; bracts 10-15, 1-seriate, equal, obovate, 3.7-4.5 mm long, 1.6-2.5 mm wide, thin, middle area green but with broad scarious margins and apex, apically obtuse and purplish, glabrous except for minute terminal glands on the margins; ligules 7-14 mm long, white, sometimes pale mauve below, or pinkish. Cypselas obovate, 1.8-2.3 mm long, 1-1.3 mm wide, uniformly brown; lateral faces each with 2 longitudinal ridges, central portion smooth or somewhat tuberculate, hairy; margins entire, swollen, hairy; pappus c. 0.3-0.4 mm long. The taxon flowers from Dec.-Mar (VicFlora 2018). The taxon is extensively rhizomatous, forming clonal patches to 0.5 m wide, and forming extensive dense colonies.

DELWP's Vital Attribute database considers this taxon to regenerate after fire mostly by resprouting (seed response unknown), takes two years to reach reproductive viability, lives 10-50 years, is tolerant of establishment in mature vegetation, and has seeds that survive 50+ years in the soil. However, Brock (2011) suggests seeds might only be viable for around 7 years.

Generation Length

The generation length of *Brachyscome radicans* is estimated to be 15 to 30 years. DELWP's Vital Attribute database considers this taxon to regenerate after fire mostly by resprouting (seed response unknown), takes two years to reach reproductive viability, lives 10-50 years, is tolerant of establishment in mature vegetation and has seeds that survive 50+ years in the soil. However, Brock (2011) suggests that the seeds might only be viable for around 7 years and assessors consider the generation time to be around 15-30 years. Fire is historically rare in alpine ecosystems, occurring perhaps once or twice a century, and, on average, perennial herbs are likely to reach the end of their reproductive life prior to another fire. In undisturbed vegetation, the average plant age of a taxon that does not experience a post-fire recruitment pulse is likely to be at the mid-range of the estimated lifespan, reflecting on-going recruitment.

Distribution

The taxon is restricted to the high country of far eastern Victoria, mostly on the Nunniong Plateau and nearby areas (e.g. Morass Creek near Benambra). The taxon also occurs in NSW, ACT, and Tasmania (VicFlora 2018). Additional records from Birregun State Forest north to the Bogong High Plains are included in this assessment, however they are yet to be verified. Records from the Snowy Range and Baw Baws almost certainly derive from specimens that have been falsely determined to be the superficially similar *B. barkerae* and *B. obovata* respectively.

Habitat

The taxon grows in swampy situations in the high country of far eastern Victoria (VicFlora 2018).

Threats

Key threats to the taxon's habitat are increased fire and drought due to climate change, as well as grazing. Fire will affect the subpopulations differentially, as will the types and intensity of grazing. Nunniong is different to Bogong High Plains, with the former having cattle and more horses. Other threats include feral horses, Sambar deer, and potentially pig activity and weed invasion by *Anthoxanthum, Trifolium repens*, and *Holcus,* among others. Green et al. (2013) showed that *Brachyscome* species are also commonly grazed by hares. Forestry operations in catchments may have contributed to past decline.

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 45 to 90 years is estimated to be 10 to 30%, based on (c) and (e) above.

Past decline is primarily based on the effects of cattle grazing.

Eligible under Criterion A3 as Endangered

The population reduction over the next 45 to 90 years is projected to be 20 to 50%, based on (c) and (e) above.

Future decline is based on the effects of the identified threats.

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 3,191 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, and is estimated to have 2 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

The taxon is severely fragmented naturally at the landscape scale. Geographically isolated stands occur at separations typically exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal.

Continuing decline is 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 76 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is estimated to be severely fragmented and have 2 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

As above, continuing decline is based on the current and projected impact of the identified threats.

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

It is estimated that there are 15,000 to 30,000 mature individuals, which exceeds the thresholds for criterion C.

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 D as Vulnerable

It is estimated that there are 15,000 to 30,000 individuals, and 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

Armstrong J. A. (1979) Biotic pollination mechanisms in the Australian flora - A review. *New Zealand Journal of Botany, 17*, 467-508.

Brock, M. A. (2011). Persistence of seed banks in Australian temporary wetlands. *Freshwater Biology, 56*, 1312-1327.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

Green, K., Davis, N. E., Robinson, W. A., McAuliffe, J., & Good, R. B. (2013). Diet selection by European hares (*Lepus europaeus*) in the alpine zone of the Snowy Mountains, Australia. *European Journal of Wildlife Research, 59,* 693-703.

Short, P.S. (1999). Brachyscome. In N. G. Walsh & T. J. Entwisle (Eds.), *Flora of Victoria Vol. 4, Cornaceae to Asteraceae*. Inkata Press, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Brachyscome radicans.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/aa0fa4e9-3610-4ee0-962a-1b8c21b37082