Threatened Species Assessment

Drabastrum alpestre
Mountain Cress

Taxonomy

Drabastrum alpestre (F. Muell.) O.E. Schulz

The taxon is characterised by its habitat, the stalked, branched hairs on the stems, and the more or less terete, obovoid to ellipsoid fruits (VicFlora, 2017).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1991).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+4ace; B1ab(iii)+2ab(iii)

Species Information

Description and Life History

The taxon is a perennial herb with a woody base rhizome; stems erect, rigid, terete or finely fluted, generally to 15 (but up to 40) cm high, with stalked, branched hairs. Basal leaves petiolate, entire to pinnately notched, to 5 cm long; stem leaves few, reducing to sessile. Sepals 2-3 mm long; petals 3.5-6 mm long. Fruit erect to spreading, obovoid to ellipsoid, 5-9 mm long (excluding style), c. 2 mm wide; style 0.5-1 mm long; pedicels spreading to horizontal, 5-11 mm long; seed coat reticulate The taxon flowers from spring to summer (VicFlora 2017).

Generation Length

The generation length of *Drabastrum alpestre* is estimated to be 5 to 50 years. Although Walsh & McDougall (2004) suggest the taxon is short-lived, the genus is monotypic and described as a perennial herb or shrub with a woody rhizome (VicFlora 2017). From this it can be inferred that rosettes are ramets connected by a potentially long-lived subterranean rhizome system. Although the longevity of each ramet may only be 5-10 years, the longevity of the genet may be indefinite. Seed-based recruitment may be a relatively rare event and may be episodic in response to disturbance events or opportunistic or continuous in response to optimal seasonal conditions.

Distribution

In Victoria, the taxon is currently known from only 2 small populations in dry, rocky habitat north of Licola. These are at the top of Bryces Gorge, and at Dimmicks Lookout in the Snowy Range. It has also been collected in the headwaters of the Snowy and Murray Rivers in 1854, in the Omeo district in 1882, and at Suggan Buggan in 1939, however in the absence of recent records it is likely to be extinct at each of these locations. In 1982 Neville Scarlett stated that he had searched both the Suggan Buggan site and the Hinnomunjie site near Omeo without relocating the taxon. The Hinnomunjie site was then already very closely grazed farmland.

The taxon is rare throughout Australia, extending to NSW and the ACT (VicFlora 2017).

Habitat

The taxon occurs in dry, rocky habitat at 1500 m elevation in the Snowy Range north of Licola, and has been recorded also on sandy substrates at 370 m elevation near Suggan Buggan (VicFlora 2017). In the Snowy Range the taxon occurs in Snow Gum woodland dominated by *Eucalyptus pauciflora,* with a heathy understorey on brown gravelly loam on rocky outcrops. At Suggan Buggan the taxon occurred in association with *Lissanthe strigosa* (Peach Heath) on dry sandy soil. In the Omeo district the taxon was collected on alluvial flats. In the Cobberas-Mt Pilot area on the NSW border, the taxon was collected in subalpine grassy meadows.

Threats

Like other members of the Brassicaceae, the taxon is almost certainly highly palatable and therefore threatened by browsing, particularly by exotic herbivores including by cattle, sheep, rabbits, hares and, increasingly, by feral horses and Sambar Deer (*Rusa unicolor*). At lower elevations the taxon may be threatened also by native macropods including the Eastern Grey Kangaroo (*Macropus giganteus*) and Red-necked Wallaby (*Macropus rufogriseus*), particularly during drought. The taxon has almost certainly suffered significant historic decline and is likely to have been eliminated from the Omeo, Suggan Buggan, and Cobberas-Mt Pilot districts by alpine stock grazing and, potentially, by feral horses. In the Omeo district at least, the taxon has undoubtedly been eliminated through habitat loss to agriculture. The inferred historic elimination of the taxon from subalpine grassy meadows and alluvial flats, and its apparent survival only on rocky outcrops, strongly supports the inference that the taxon is highly susceptible to browsing pressure. It is less clear whether the taxon is threatened by climatic warming and drying and by increasing frequency and intensity of fire since the habitat range of the taxon suggests it is at least moderately resilient to drought stress. In the longer term, however, extreme and prolonged drought stress may exceed the drought tolerance of the taxon, resulting in adult mortality, recruitment failure, seedbank depletion and local extinction. The taxon may also benefit from some disturbances such as fire (Walsh & McDougall 2004) which is projected to increase in frequency in the Victorian alpine region in the future. The taxon may also be threatened by competition from weedy exotics as illustrated by quadrat data taken in 1980 near Guy's Hut on Bryces Plain on the Snowy Range, where 7 exotic weeds account for a sixth of the 42 plant taxa recorded, most of these introduced by cattle grazing which was still current at the time. An additional threat noted on the south side of Pieman Creek above Bryces Gorge in 1982 was the abundant evidence of accelerated erosion and disturbance associated with parties of walkers climbing and scrambling up-slope at the site. This threat alone had the potential to destroy the colony of *D. alpestre* at the site. When this site was revisited in 1989 no plants could be found despite careful searching.

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 Critically Endangered

The population reduction over the past 15 to 150 years is estimated to be 50 to 80%, based on (c) and (e) above.

The inferred local extinction of the taxon from three of the four known or suspected Victorian locations is compelling evidence of significant historic decline, as a consequence of habitat loss to agriculture and grazing pressure. The taxon is likely to be long extinct at Hinnomunjie at the junction of Livingston Creek and Mitta Mitta River near Omeo, at Suggan Buggan, and in the Cobberas-Mt Pilot area.

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 15 to 100 years is projected to be 30 to 90% (midpoint 50%), based on (c) and (e) above.

Future decline cannot be estimated with any confidence since the identified threats operate stochastically and with unpredictable intensity, and some threats may neutralise the impact of other threats at least in the short-term.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 15 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 50 to 90% (midpoint 70%), based on (c) and (e) above. The causes of reduction may not have 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 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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the landscape scale and, if it survives in the Suggan Buggan, Omeo, or Cobberas districts, it is also severely fragmented naturally at the subregional scale. The only plausible dispersal agents are ants (myrmecochory) which operate at the metre scale.

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

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 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) 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

There is insufficient evidence to determine the number of 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.

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.

SAC (1991). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 174 *Drabastrum alpestre.*

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Drabastrum alpestre.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b72de03b-90cf-4166-a0c8-828b9f0eacbe

Walsh, N. G., and McDougall, K. L. (2004). Progress in the recovery of the flora of treeless subalpine vegetation in Kosciuszko National Park after the 2003 fires. *Cunninghamia, 8*, 439-452.