

Barbarea grayi Native Wintercress

Taxonomy

Barbarea grayi Hewson

Prior to 1982, the taxon was known as *Barbarea australis*.

This mainland Australian taxon has been reported from Victoria under two incorrect names. *Barbarea grayi* differs from the Tasmanian endemic *B. australis* in having a more crowded inflorescence (c. 2 fruits per cm) and winged seeds, and from *B. vulgaris*, a European taxon naturalised in New Zealand, in having a style 1 mm long or less (VicFlora 2018).

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criterion A2bce; B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v); D2

Species Information

Description and Life History

The taxon is an annual or biennial, to 90 cm high, erect, robust, glabrous. Basal leaves with long petioles, and terminal ovate lamina, sometimes with 1 pair of lateral lobes, thickish; lower stem leaves with up to 6 pairs of lateral lobes; upper stem leaves simple or with 1 pair of lateral lobes, margins scalloped or toothed. Sepals 3-3.5 mm long; petals 5-6.5 mm long. Fruit more or less erect, linear, 2-6 cm long (including style), 2-2.5 mm wide; style 0.5-1 mm long; pedicels erect to spreading, 3-7 mm long, c. 1 mm diam.; seed with a narrow tuberculate wing. The taxon flowers in the summer (VicFlora 2018).

Generation Length

The generation length of *Barbarea grayi* is estimated to be 5 to 10 years. This is based on the inference that the taxon recruits opportunistically in response to localised site disturbance events, such as gap creation and seasonal conditions. The longevity is likely to be 1-3 years, with the taxon recruiting from a soil-stored seedbank. Recruitment may be pulsed in response to rare fire events, but is not likely to be fire-dependent.

Distribution

The taxon occurs discontinuously from Mt Buller and the Snowy Range in the west, to Mt Hotham, the Bogong and Dargo High Plains, the Nunniong Plateau, and the headwaters of the Buchan River in the east. The taxon also occurs in New South Wales and the Australian Capital Territory.

Habitat

The taxon grows in damp areas near high-altitude streams, but it is rather rare and perhaps depleted through high-country grazing (VicFlora 2018).

Quadrat and monitoring data indicate that the taxon is consistently associated with taxa which characterise a range of moist to wet forest and woodland communities, high elevation riparian thickets and wetland habitats. This



Barbarea grayi Native Wintercress

includes *Eucalyptus dalrympleana*, *E. rubida*, *E. pauciflora*, *E. stellulata*, *E. viminalis*, *Leptospermum grandifolium*, *Acacia dealbata*, *A. melanoxylon*, *Kunzea ericoides* spp. agg., *Lomatia fraseri*, *Pittosporum bicolor*, *Hakea microcarpa*, *Baeckea gunniana*, *Epacris paludosa*, *E. breviflora*, *Coprosma quadrifida* and *Tasmannia lanceolata*, the native herbs *Acaena novae-zelandiae*, and *Epilobium billardiarianum* subsp. *cinereum*, the sedges *Carex appressa* and *C. gaudichaudiana*, the grass *Poa helmsii*, the tree fern *Dicksonia antarctica*, and the ground fern *Blechnum nudum*.

Threats

The taxon has undoubtedly significant historic decline in response to targeted browsing by cattle, feral horses and Sambar Deer *Rusa unicolor* across its Victorian range. The taxon is inferred to be highly palatable since it belongs to the genus *Barbarea*, which includes the salad vegetable *Barbarea verna* or Early Wintercress. The taxon may have also recovered at some sites following the cancellation of stock grazing licences within the Alpine National Park. However, grazing continues in parts of the Nunniong Plateau, and feral horses and Sambar are both undergoing population explosions, particularly across the eastern parts of the Victorian range of the taxon. The activity of these three exotic herbivores also results in habitat degradation through pugging of wetland and streambank habitats, as well as facilitation of weed invasion. This results in the local contraction and elimination of suitable habitat across the range of the taxon.

The taxon is also threatened by weed invasion and competition, with quadrat data indicating that some sites are heavily invaded by the aggressive perennial exotic *Rubus polyanthemus* (Forest Blackberry) and other Blackberry taxa. Climatic drying and increasing fire risk are projected to result in a local contraction of the forest and wetland habitat available to the taxon.

Quadrat data further indicates that the taxon typically occurs at consistently low density, with projective foliage cover less than 1% at the quadrat scale, rarely 1-5%. Such low density increases the susceptibility of the taxon to stochastic events, and the risk of seedbank exhaustion and local extinction. It is unclear whether the taxon is naturally rare at the local scale or whether the observed low densities reflect continuing impacts of exotic herbivores.

Some sites on the Nunniong Plateau and other unreserved sites may have been impacted by past forestry operations, which facilitated weed invasion and hydrological impacts such as siltation and reduced stream flow during the early decades of forest regeneration, noting that the degree of impact on streamflow varies according to forest type.

Spatial analysis of likely habitat for Native Wintercress on all tenures indicates that 79% occurs within the CAR reserve system, including parks and reserves, special protection zones and areas excluded from harvesting by prescription under the Victorian Code of Practice for Timber Production 2014 (the Code). No species-specific protections for the taxon are included in the Code however other more general forestry prescriptions such as protection and buffering of waterways, riparian thickets and wetlands provide protection from timber harvesting.

In recent years, modified harvesting and forest regeneration practices have been implemented in native forest to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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 style="text-align: center;"><i>based on any of the following:</i></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 Vulnerable

The population reduction over the past 15 to 30 years is suspected to be 10 to 30%, based on (b), (c) and (e) above.

Whilst the taxon has undoubtedly suffered significant historic decline, a significant proportion of this decline is likely to have occurred prior to the last 3 generations. The taxon is also likely to have recovered at some sites following the cancellation of stock grazing licences within the Alpine National Park. However, grazing continues in parts of the Nunniong Plateau, while feral horses and Sambar are both undergoing population explosions, particularly across the eastern parts of the Victorian range of the taxon.

The taxon is believed to have 53% of its 19 Victorian sites occurring within the footprints of the 2019/20 bushfires. There is currently some uncertainty whether the taxon is fire sensitive or fire tolerant in the context of these fires, but it is considered to have been at some risk of post-fire impacts.

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 ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 B as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 7,489 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) across the taxon's range is estimated to be 80 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

Seven locations can be distinguished based on land tenure, with occurrences within the Alpine National Park currently protected from the impact of cattle grazing or logging, which continue to operate at some sites outside the park system. Other sites may be affected by any of the identified threats at different scale and timing.

It has a continuing decline in (ii), (iii), (iv) and (v) above, 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 as Data Deficient

There is insufficient evidence to determine the number of mature individuals.

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 ² 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



Barbarea grayi
Native Wintercress

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Barbarea grayi*. Retrieved from:
<https://vicflora.rbg.vic.gov.au/flora/taxon/161c45e8-b081-4a25-9e12-fb3b4232e822>