Threatened Species Assessment

Cardamine lilacina
Lilac Bitter-cress

Taxonomy

Cardamine lilacina. sensu I.R. Thompson (1996)

Current conservation status

Categorised as Vulnerable 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

Glabrous perennial to 50 cm high; taproot persisting, rootstock gradually elongating with age and commonly branching; flowering stems mostly erect, sometimes trailing. Leaves thin to somewhat fleshy; basal leaves numerous, rosetted, 5-15(-25) cm long, mostly pinnate with 1-4 lateral pinna pairs, terminal pinna orbicular, usually strongly cordate-based, crenate or sometimes dentate, lateral pinnae short to long-petiolulate, more or less orbicular; cauline leaves 0-6, to 10 cm long, variably reducing in size up the stem, pinnate or pinnately divided. Raceme usually many-flowered; sepals 2-4 mm long; petals 4.5-12 mm long, white or pink; mature style to 4 mm. Fruits erect to spreading, 10-50 mm long, 1.5-3 mm wide; pedicels 10-25 mm long; seeds 1.5--3 mm long. Flowers spring-autumn (VicFlora 2018).

Generation Length

The generation length of *Cardamine lilacina.* is estimated to be 10 to 15 years. Vital Attribute data suggest that this taxon reaches reproductive maturity at 1 year, lives up to 10 years, but persists in the soil seed bank up to 100 years. Regeneration under pre-settlement conditions is likely to have involved fire at high altitudes, and fire and grazing at lower altitudes. 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, but persist in the soil seed bank. In undisturbed vegetation, the average plant age is likely to be at the mature end of the estimated lifespan, reflecting the post-fire pulse and on-going recruitment. For *C. lilacina*, suspect average age is around 10 years.

Distribution

The taxon is widely distributed across a range of vegetation classes in Victoria, as well as in NSW, ACT, and Tas. Taxonomic uncertainty makes the estimation of actual distribution fraught.

Habitat

This taxon is probably part of a complex of taxa occurring in lower altitude forests, subalpine woodland, and various alpine habitats (VicFlora 2018), and it may be associated with disturbance, such as timber harvesting or fire. Taxonomic uncertainty makes it difficult to determine the preferred habitat.

Threats

The taxon is likely to be threatened by climate change and drying due to its preference for damp habitat, as well as trampling of habitat by feral horses on the Bogong High Plains and East Alps.

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 Vulnerable

The population reduction over the past 30 to 45 years is estimated to be 20 to 40%, based on (c) above.

The number of mature individuals is likely to have declined due to the identified threats causing declines in area and habitat quality.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 30 to 45 years is projected to be 20 to 40%, based on (c) above.

The number of mature individuals is likely to continue to decline due to the identified threats, leading to declines in area and habitat quality.

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 3,969 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. It has a patchy distribution with most occurrences isolated from other occurrences at separations exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal.

It is estimated to have 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above due to the identified threats, with marginal habitat in drier areas at most risk.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 40 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 3 locations, 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:

Ineligible under Criterion C

It is estimated that there are 10,000 to 40,000 (midpoint 20,000) 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

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.

McCarthy, G. J., Tolhurst, K. and Chatto, K. (2003). *Determination of sustainable fire regimes in the Victorian Alps using plant vital attributes.* Research Report No. 54, Victoria: Fire Management, Department of Sustainability and Environment.

VicFlora (2018) Flora of Victoria, Royal Botanic Gardens Victoria: *Cardamine lilacina*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b2d2e920-d20a-4e93-9998-6a1181aa96b1