

## *Veronica nivea* Milfoil Speedwell

### Taxonomy

*Veronica nivea* Lindl.

Previously *Derwentia nivea*

### Current conservation status

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

### Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,iv,v)

### Species Information

#### Description and Life History

Softly woody shrub; stems erect or ascending, 15-50 cm long, often appearing unbranched but most nodes bearing very short lateral branches with compact clusters of leaves, stems usually dying back to base after fruiting, internodes with sparse curved or twisted hairs in longitudinal bands. Leaves usually 1.5-3 cm long, c. glabrous, once or twice pinnately divided into 2-17 linear lobes, ultimate divisions 0.5-1.2 mm wide. Racemes mostly 5-17 cm long, 20-40-flowered. Calyx-lobes 2-5 mm long, 1-1.5 mm wide in fruit, glabrous or sparsely hairy near base; corolla 3.5-6 mm long, mauve (rarely white, or blue). Capsule broad-obovate, 4-6.5 mm long and almost as broad, deeply emarginate, strongly compressed, glabrous. Flowers summer (VicFlora 2018).

#### Generation Length

The generation length of *Veronica nivea* is estimated to be 30 to 50 years. DELWP's Vital Attribute database does not have data related to *V. nivea*. Related species regenerate from seeds after fire (with complete germination of stored seeds), may or may not resprout, take two years to reach reproductive maturity, live 10-50 years and have seeds that persist 50+ years in the soil. Surveys two years after the 2009 fire found *V. nivea* regenerating profusely from seed but not vegetatively, and plants were flowering (Tolsma et al (2012), consistent with vital attributes for congeners.

Fire is historically rare in alpine ecosystems, occurring perhaps once or twice a century and, on average, perennial shrubs are likely to reach the end of their reproductive life prior to another fire. In undisturbed vegetation, the average plant age of a re-seeder species is likely to be at the older end of the estimated lifespan, reflecting the recruitment pulse after the last fire and lower-level recruitment thereafter.

#### Distribution

The taxon occurs in alpine and subalpine areas. It has been recorded from the Baw Baw and Buffalo Plateaus, Lake Mountain and Falls Creek areas.

#### Habitat

The taxon occurs in alpine and subalpine grassland, heath, bogs, and woodlands, often in disturbed habitats (e.g. road and track margins). Surveys after the 2009 fires found large numbers of seedlings around the edges of wet

heathland/bog (Tolsma et al 2012). It is considered to be very rare in older vegetation, but may regenerate profusely after fire (Williams et al 2008).

## Threats

Alpine species are prone to range contraction due to climate change, of which the impacts, particularly in wetter habitats, are likely to be seen first in marginal, lower-elevation sub-populations. Large fires are becoming more frequent and, given that seeds in the soil might be depleted after a single fire, two fires at a short interval will be particularly detrimental. Increasing impacts of feral horses and deer might be countered around the Bogong HP to a small extent by recovery from cattle grazing that was removed in 2005.

## 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>
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## Evidence:

### Eligible under Criterion A3 as Vulnerable

The population reduction over the next 90 to 100 years is projected to be 20 to 30%, based on (c) and (e) above.

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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 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 Victorian Biodiversity Atlas.

Alpine species tend to exist in 'islands' of habitat within a matrix of lower-altitude forest. This forest separates subpopulations reproductively, but links them in terms of fuel, and fire can affect large areas.

is estimated to have four locations (Baw Baw, Lake Mountain, Mt Torbreck, Mt Buffalo), separated by at least 40 km. These locations, separated by lower-altitude forest, are unlikely to be burnt by the one fire.

It 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 suspected that there are 20,000 to 40,000 mature individuals, which exceeds the thresholds for criterion C.

Despite being considered very rare in undisturbed vegetation (Williams et al 2008), *V. nivea* regenerated in large numbers after the 2009 fires, with more than 1000 plants estimated in one population at Lake Mountain (an area slightly larger than a standard quadrat) (Tolsma et al 2012). Six other populations in the same area were more scattered and consisted of only 50-100 plants in a quadrat. Many of the plants are expected to die back naturally over time through plant-plant competition. Assuming that there are 100 plants in a population, and that the 63 records in the VBA represent less than a quarter of the total population (habitat can be remote, especially at Baw Baw), then the total population is at least 25,000, albeit with considerable uncertainty.

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 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

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