

Aciphylla glacialis Snow Aciphyll

Taxonomy

Aciphylla glacialis (F. Muell.) Benth.

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 A2ce; B2ab(ii,iii,iv,v)

Species Information

Description and Life History

Stout, erect herb with robust rootstock, 25-60 cm high. Leaves stiff, mostly basal, some cauline, 2-3-pinnate, fan-like; lamina ovate or elliptic in outline, 10-30 cm long (including sheathing base), 4-9 cm wide; segments linear, acute with aristate tip; basal sheath 6-16 cm long, 10-20 mm wide. Male inflorescence slender, spreading, the female more robust and contracted with stouter peduncles; 7-16 umbellules per compound umbel. Flowers 2.5-3 mm diam.; petals 1-1.5 mm long; stamens often exceeding petals in male flowers. Fruit 5.5-10.5 mm long, 2-3 mm wide. Flowers in summer (VicFlora 2017).

Venn and Morgan (2009) found that conditions that suited germination of other alpine species were not necessarily those that stimulated *A. glacialis*. Seed dormancy was broken by wet-cold stratification, and this implies that this taxon is a strict spring germinator. Furthermore, the few observations of *A. glacialis* seedlings emerging in the field are restricted to spring and early summer.

Hoyle et al. (2014) further found that germination of *A. glacialis* occurred even when the period of cold-stratification was only 4-6 weeks, suggesting that germination is unlikely to be affected by the predicted shortening of winter duration.

Briceno et al. (2014) noted that individual plants are rarely seen in the field at Kosciuszko; instead large clumps of plants are common. Some of the leaves die while the plants are covered in snow in winter, but a large proportion of the foliage remains intact while under snow. New leaves emerge when the snow melts in late spring, followed by flowers in early summer. Fruit maturation is rapid and seeds disperse by late summer.

Generation Length

The generation length of *Aciphylla glacialis* is inferred to be 20 to 50 years. DELWP's Vital Attribute database suggests that the taxon reproduces by seed after fire (from long-lived seeds with partial germination), as well as from resprouts (with mature plants becoming juvenile). The taxon reaches reproductive maturity after 2 years. It is a medium-lived (10-50 years) perennial with seeds that persist in soil between fires (50+ years). The taxon is unable to establish immediately after fire within the first season or two, but it can establish in older vegetation, including mature to over-mature vegetation. Therefore, the taxon requires some environmental characteristics not found in vegetation straight after fires.

Fire is historically rare in alpine ecosystems, occurring perhaps once or twice a century, although drought may occur more often. On average, perennial shrubs and herbs are likely to reach the end of their reproductive life prior

to another disturbance. In undisturbed vegetation, the average plant age of a taxon that does not experience an obvious post-fire or post-drought recruitment pulse is likely to be at the mid-to-high range of the estimated lifespan, reflecting ongoing recruitment.

Distribution

The taxon occurs in Central Victorian Uplands, Highlands Northern Fall, Highlands Southern Fall and Victorian Alps (VicFlora 2017).

Habitat

The taxon is locally common in tussock grassland and tall herb field in alps and higher subalps. It rarely occurs in Snow-gum woodland. The taxon is often rare in grazed areas (VicFlora 2017).

Threats

Alpine regions have been subject to a long history of livestock grazing since European settlement and this will have impacted on vegetation communities through selective grazing and physical disturbance, particularly of wetter areas. The taxon is preferentially grazed and uncommon in long-grazed vegetation. Fire also became more frequent after settlement, leading to a long-term decline in habitat quality for many taxa. Alpine plants are likely to be severely impacted by fires in rapid succession and, given that this taxon is usually found in open vegetation, climate change would have severe impacts if it leads to an increase in woody shrubs and trees.

The taxon is relished by stock and is often rare in grazed areas. The cessation of cattle grazing should help populations recover but this is likely to be countered by increased drought and woody vegetation pressure from climate change and in some areas, persistence of feral horse activity. *A. glacialis* is also grazed by hares (Green et al. 2013).

Venn et al (2013) confirmed that *A. glacialis* had high freezing tolerance. However, Briceno et al (2014) found that seedlings from early snow melt sites were more frost resistant and had a greater capacity to increase frost resistance in response to low temperatures than seedlings from late snow melt sites. The loss of snow cover in some areas from a changing climate could therefore increase vulnerability of *A. glacialis* to lethal freezing.

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> <ul style="list-style-type: none"> (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 60 to 150 years is inferred to be 40 to 60%, based on (c) and (e) above.

Alpine regions have been subject to a long history of livestock grazing since European settlement and this will have impacted on vegetation communities through selective grazing and physical disturbance, particularly of wetter areas. The taxon is preferentially grazed and it is uncommon in long-grazed vegetation. Fire, deliberate or otherwise, also became more frequent after settlement, leading to a long-term decline in habitat quality for many taxa. Indeed, Costin (1959) suggested that grazing and inappropriate fire had led to *A. glacialis* being virtually eliminated in some alpine areas by the turn of last century. It is probable that half of the population at European settlement has been lost, mostly due to grazing.

The causes of the 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 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 308 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

The taxon is estimated to be severely fragmented. There are small subpopulations scattered across a wide geographic area, in a variable-sized 'islands' of habitat within a matrix of lower-altitude forest. This tends to isolate subpopulations reproductively, therefore if a subpopulation is lost, there is little or no opportunity for recolonisation.

It is estimated to have four locations. 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 and affect all individuals in the area.

It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the predicted habitat loss from the impacts of grazing, bushfire and climate change. It is possible that the population might expand slightly for next few decades, before decreasing again.

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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 inferred that there are 10,000 to 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 km ² or number of locations ≤ 5 [Ⓜ]

Evidence:

Ineligible under Criterion D

It is inferred that there are 10,000 to 20,000 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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