



## *Epacris petrophila* Snow Heath

### Taxonomy

*Epacris petrophila* Hook. f.

### 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(i,ii,iii,iv,v)

### Species Information

#### Description and Life History

*Epacris petrophila* is an erect shrub to c. 80 cm high. Branchlets densely covered with short retrorse hairs. Leaves suberect to appressed, ovate to obovate, 1.4-3.2 mm long, 0.8-1.5 mm wide, glabrous,  $\pm$  planoconvex in section, slightly keeled beneath, venation obscure; apex tapered to a subacute or obtuse  $\pm$  incurved tip; margins smooth or minutely serrulate; base obtuse to cuneate, appressed to stem; petiole indistinct, 0.1-0.2 mm long. Flowers subsessile, forming small terminal clusters to 1 cm long; bracts 8-10; sepals ovate, 2-3 mm long, subacute; corolla white, campanulate, glabrous, tube 1.3-2 mm long, slightly shorter than calyx, lobes recurved, 1.8-2.5 mm long, obtuse; anthers partly exerted; ovary glabrous; nectary scales truncate; style straight-sided, 0.3-0.6 mm long, glabrous. Flowers Dec.-Feb. (VicFlora 2019). Vital attribute data were not available for this taxon, but are likely to be similar to other alpine bog *Epacris* taxa, which are mostly reliant on seeds for regeneration, may not resprout (Walsh and McDougall 2004), tolerant of establishment in mature vegetation, take 5 years to reach reproductive maturity, live for around 50 years and maintains a soil seedbank for around 100 years. However, no seedlings were found 2 years after the 2009 fire, suggesting that reproductive capacity might be low or that germination requires additional cues (Tolsma *et al.* 2012). Walsh and McDougall (2004) suggest that germination may take at least 18 months.

#### Generation Length

The generation length of *Epacris petrophila* is estimated to be 30 to 50 years. It is a long-lived perennial that, under a pre-settlement disturbance regime of fire once or twice per century, would generally live to end of reproductive age of up to 50 years.

#### Distribution

According to VicFlora (2019), the taxon is known only from Lake Mountain, the Baw Baw Plateau, and Mt Howitt, however, there are also numerous Victorian Biodiversity Atlas (VBA) records on the Bogong HP and in east alps.

The taxon is also found in NSW and Tas.

#### Habitat

The taxon is found in summit areas and is often locally plentiful in subalpine heathland on the margins of pools, in bogs and in frost hollows (VicFlora 2019).

### Threats

Due to the taxon's reliance on bog habitat, threats would include anything that would physically disturb the habitat or dry it out, including trampling by feral ungulates (deer in most areas, and feral horses in the east alps), cattle grazing in the Nunniong region, climate change leading to drying out of the habitat and increasing the frequency of fire, and willow invasion post-fire. Recruitment after fire may be very limited as it was not observed two years after the 2009 fire (Tolsma *et al* 2012), and it was recorded mostly in unburnt quadrats during surveys after the 2003 fires (Walsh and McDougall 2004), hence the taxon is likely to be particularly susceptible to successive fires.

### 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"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

### Evidence:

#### Eligible under Criterion A2 as Endangered

The population reduction over the past 90 to 150 years is estimated to be 30 to 50%, based on (c) and (e) above.

Anecdotal evidence suggests that alpine bog, the main habitat for this taxon, has reduced by up to 50% since settlement due to a combination of livestock grazing and increased fire. The total population 150 years ago is assumed to be double the current population.

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 <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 B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 14,246 km<sup>2</sup>, based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, considering its limited dispersal, the barriers to dispersal, and the lack of habitat separating them.

It is estimated to have 5 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the identified threats.

#### Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 228 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 5 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 20,000 to 40,000 (midpoint 30,000) mature individuals, which exceeds the thresholds for criterion C.

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:

#### Ineligible under Criterion D

It is estimated that there are 20,000 to 40,000 (midpoint 30,000) mature individuals, which exceeds the threshold for criterion D.

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.



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Tolsma, A., Sutter G. and Coates F. (2011). Recovery of Victorian Rare or Threatened Plant Species After the 2009 Bushfires. *Black Saturday, Victoria 2009 - Natural Values Fire Recovery Program*, Report to the Department of Sustainability and Environment.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Epacris petrophila*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/b298787d-bbc6-4c0a-b4c4-3c4a9ce3a44b>

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