Threatened Species Assessment

Stackhousia pulvinaris
Alpine Stackhousia

Taxonomy

Stackhousia pulvinaris F. Muell.

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 A3ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a glabrous, mat-like perennial to 3 cm high, c. 20 cm diam. (sometimes in groups to 3 m diam.), with many short intricate branches. Leaves linear-obovate, 4-11 mm long, 1-1.5 mm wide, obtuse, thickish, usually yellow-green. Flowers solitary, subsessile in uppermost leaf axil, fragrant; bracts and bracteoles minute. Hypanthium 0.5-0.9 mm long; sepals 0.7-1.2 mm long, entire, obtuse; corolla white to pale yellow, tube 3.3–5.6 mm long, lobes 2.5-3.8 mm long, obtuse to broadly acute; gynoecium 3-partite. Mericarps 1-3, broadly obovoid, c. 2.5 mm long, reticulate-rugose to nearly smooth, glabrous; basal cavity small, shallow. The taxon flowers from November to January (VicFlora 2019).

Generation Length

The generation length of *Stackhousia pulvinaris* is estimated to be 20 to 50 years. Fire is historically rare in alpine ecosystems, occurring perhaps once or twice a century and, on average, perennial shrubs and herbs are likely to reach the end of their reproductive life prior to another fire. In undisturbed vegetation, the average plant age is likely to be at the older end of the estimated lifespan, reflecting the recruitment pulse after previous fire events and lower-level recruitment thereafter.

Distribution

In Victoria, the taxon is mainly restricted to the Bogong High Plains and Snowy Range. It also occurs in New South Wales and Tasmania (VicFlora 2019).

Habitat

The taxon occurs in alpine herbfields and subalpine grasslands, often in small depressions that are inundated following snow-melt.

Threats

Subpopulations and habitat are considered at risk from disturbance, weed invasion, increasingly dry conditions from declining rainfall, and a consequent increase in severity and intensity of bushfires.

Alpine taxa are prone to range contraction due to climate change, with effects likely to be seen first in marginal, lower-elevation sub-populations. Large fires are becoming more frequent and two fires at a short interval will be

particularly detrimental to the taxon and its habitat. Feral horses and deer are rapidly increasing in number and causing significant effects in alpine ecosystems. Cessation of cattle grazing has removed it as a source of grazing pressure.

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 A3 as Endangered

The population reduction over the next 60 to 100 years is suspected to be 20 to 60% (midpoint 40%), based on (c) and (e) above.

Future reduction is based on the risk from disturbance, weed invasion, increasingly dry conditions from declining rainfall, and a consequent increase in severity and intensity of bushfires.

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 20 to 60% (midpoint 40%), based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

This taxon appears somewhat tolerant of grazing pressures (Tolsma 2002) so has possibly seen some decline with past cattle grazing.

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 2,217 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented as alpine taxa tend to exist in variable-sized 'islands' of habitat within a matrix of lower-altitude forest, which tends to isolate sub-populations reproductively. Fragmentation is of most concern for small, outlying sub-populations.

It is estimated to have two locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above in response to climatic drying, increased fire frequency, disturbance by feral animals, and weed invasion.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 176 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 two 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 suspected that there are 2,500 to 5,000 mature individuals, but the qualifier is too weak.

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 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

DPI (2021). *Stackhousia pulvinaris (*alpine candles*): Species Management Profile for Tasmania's Threatened Species.* Threatened Species Section. Department of Primary Industries, Parks, Water and Environment, Tasmania. Retrieved from: https://www.threatenedspecieslink.tas.gov.au/Pages/Stackhousia-pulvinaris.aspx. Accessed on 28/3/2021.

Tolsma, A. (2002). *The Effects of Fire and Grazing on the Energy Reserves of Resprouting Plants in Victoria's Alpine Grasslands.* PhD Thesis, School of Resource Management, Forestry and Amenity Horticulture, Institute of Land and Food Resources, The University of Melbourne.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Stackhousia pulinaris.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/414fab6a-16c0-42dd-a3bd-a1130a391813 accessed 25/3/2019.