Threatened Species Assessment

Pentachondra pumila
Carpet Heath

Taxonomy

Pentachondra pumila (J.R. & G. Forst.) R. Br.

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 B1ab(iv)+2ab(iv)

Species Information

Description and Life History

The taxon is a prostrate to decumbent mat-forming shrub to c. 10 cm high, rooting at the nodes; branchlets glabrescent. Leaves crowded, erect to suberect, oblong to elliptic, 3-6 mm long, 0.5-2.5 mm wide, obtuse, glabrous, flat or slightly concave, lower surface glabrous with 3-7 veins; margins smooth. Flowers bisexual, ± sessile, on hardened current or previous season's wood; bracts, bracteoles and sepals ovate to ovate-orbicular, obtuse; bracts 0.4-1 mm long; bracteoles c. 0.6-1 mm long; sepals c. 1.7-2 mm long; corolla white, becoming brownish externally; tube narrowly urceolate, c. 4-5.5 mm long; lobes recurved to revolute, densely bearded, c. 2-2.5 mm long, style 1-2 mm long. Fruit globose to obovoid, 5-8 mm long, red, crowned by the persistent style and sometimes by the shrivelled corolla. Flowers Nov.-Jan. Plants in flower often also have ripe or ripening fruit. Fruit set in the current season overwinter in an unripe green state, ripening the following summer (Albrecht 1996; VicFlora no date). Plants in flower often also have ripe or ripening fruit. Fruit set in the current season overwinter in an unripe green state, ripen the following summer (Albrecht 1996). Seed dispersal is unlikely to be further than 20 m (Wotton et al 2016).

The taxon is eaten by skinks, and in New Zealand it is a reliable indicator of skink presence (Tocher 2003).

Generation Length

The generation length of *Pentachondra pumila* is estimated to be 50 to 70 years. It reproduces from seed, but not immediately post-fire, so it appears to require some environmental characteristic endowed by mature vegetation. It takes 10 years to reach reproductive maturity, lives for 50+ years, and has seeds that can last in the soil for another 50 years. In undisturbed conditions where major disturbance such as fire occurs perhaps once or twice per century, most plants are likely to live to full age of 50+ years, and then persist as soil-stored seed. Generation time is likely to be longer than 50 years.

Distribution

The taxon occurs in the higher alps, and is found in the Highlands-Northern Falls, Highlands-Southern Falls, and Victorian Alps Bioregions. It also occurs in NSW, Tasmania and New Zealand (VicFlora no date).

Habitat

The taxon occurs in the higher alps, predominantly in moist, open grassland or heathland communities (VicFlora no date).

Threats

The taxon is probably not threatened by stock grazing *per se* as it too low in stature, and creation of bare ground with light grazing might favour it through creation of germination microsites (Whinam and Chilcott 1999). However, it is not adapted to regular trampling, and it is found only in "natural" vegetation (Scherrer and Pickering 2006), suggesting that it is still damaged by mechanical disturbance. It is possibly grazed by hares.

Future decline is likely due to climate change, and the subsequent encroachment of denser vegetation, especially *Poa* tussocks.

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 Vulnerable

The population reduction over the next 100 years is projected to be 10 to 30%, based on (c) and (e) above.

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 1,946 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

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

It is estimated to have 2 locations, and has a continuing decline in (iv) above based on the impacts of the identified threats, such as climate change and the subsequent encroachment of denser vegetation.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 124 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 2 locations, and has a continuing decline in (iv) 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 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:

Ineligible under criterion D

It is estimated that there are 20,000 to 40,000 individuals, which exceeds the thresholds for criterion D.

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

References

Albrecht, D.E. (1996). *Epacridaceae.* In: Walsh, N.G.; Entwisle, T.J. (eds), *Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae.* Inkata Press, Melbourne.

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

Scherrer, P. and Pickering, C. M. (2006) Recovery of alpine herbfield on a closed walking track in the Kosciuszko alpine zone, Australia. *Arctic, Antarctic and Alpine Research* 38, 239-48.

Tocher, M.D. (2003) The diet of grand skinks (*Oligosoma grande*) and Otago skinks (*O. otagense*) in Otago seral tussock grasslands. *New Zealand Journal of Zoology* 30, 243-257.

VicFlora (Retrieved 2021). Flora of Victoria, Royal Botanic Gardens Victoria: *Pentachondra pumila*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/d220a5e5-85ef-4c59-838d-c50bc0660f7a

Whinam, J. and Chilcott, N. (1999) Impacts of trampling on alpine environments in central Tasmania. *Journal of Environmental Management* 57: 205-220

Wotton, D.M., Drake, D.R., Powlesland, R.G. and Ladley, J.J. (2016) The role of lizards as seed dispersers in New Zealand. *Journal of the Royal Society of New Zealand* 46: 40-65