

Pultenaea patellifolia Mt. Byron Bush-pea

Taxonomy

Pultenaea patellifolia H.B. Will.

Current conservation status

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

Proposed conservation status

Vulnerable in Australia

Criterion D2

Species Information

Description and Life History

The taxon is a spreading open shrub 1-1.5 m high; stems terete, slightly pubescent when young. Leaves alternate, almost orbicular, 3.0-3.5 mm diam., concave; apex obtuse with a short recurved mucro; upper surface glabrous, paler than lower; lower surface minutely scabrous with prominent veins and scattered pale hairs, denser at base of leaf; margin incurved; stipules lanceolate, c. 1 mm long, inconspicuous, resinous. Flowers axillary, clustered at tips of branches, often appearing umbellate; bracts absent but stipules of floral leaves may be slightly enlarged; calyx 5 mm long, sparsely hairy; bracteoles attached immediately below calyx tube, orbicular 1.5 mm diam., overlapping, dark brown and resinous; standard 11-12 mm wide, ovary pubescent. Pod inflated, lower half enclosed within calyx. The taxon flowers from September to October (VicFlora 2017).

Generation Length

The generation length of *Pultenaea patellifolia* is estimated to be 45 to 75 years. This is based on a plausible longevity of 25-45 years, and an inferred dependence on fire for mass episodic recruitment at pre-settlement intervals of 45-75 (-120) years. The taxon is likely to be a fire-sensitive obligate seed regenerator, recruiting predominantly post-fire, with some continuous recruitment in response to localised site disturbance events and seasonal conditions. The taxon is unlikely to resprout following fire, and soil-stored seedbanks are expected to persist indefinitely in the absence of fire.

Distribution

The taxon is endemic to the Black Range in the Grampians region within western Victoria (VicFlora 2017).

The origin status of the isolated population of a few plants near a picnic area at Mt Arapiles is unclear. Eight collections were taken between 1969 and 1996. It was reported in 1977 that this was "no doubt the result of deliberate introduction at picnic area". A single 1985 collection from Bogong National Park in the Victorian Alps may result from a confusion of label data or misidentification. In 1996, it was found at the summit of Mt Arapiles at Bluffs Picnic Area, south-south-east of the Telecom Repeater Station. Healthy individuals were still growing at the site in recent years (David Cameron pers. obs.) with no sign of senescence, suggesting the stand may now be self-propagating. It is unclear whether these individuals could be the same ones planted at least 50 years ago. Alternatively, the small stand may be strictly indigenous, predating any implied planting at Bluffs picnic site and lookout and induced to germinate from a soil-stored seedbank by site management activity.

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Habitat

The taxon occurs on sandy soil in heathy understorey of open forest (VicFlora 2017).

In 1996, it was reported to be growing on exposed rocky summit in low woodland dominated by *Eucalyptus goniocalyx* subsp. *viridissima* with *Acacia euthycarpa*, *Philotheca verrucosa*, *Calytrix tetragona*, *Callitris* and *Hibbertia*.

Threats

The identified habitat range suggests that the taxon is ecologically adaptable and is likely to be resilient in the face of individual threats, such as climate change and imposed fire regimes. The key threat to the taxon in the medium to longer term, however, is the combined impact of these threats operating synergistically. Climatic drying and warming, coupled with increasing frequency and landscape scale of natural and anthropogenic fire, increases the risk of recruitment failure and adult mortality. This results in seedbank depletion, ultimate seedbank exhaustion, and local extinction. The increasing risk of repeat fire events at intervals approaching or below the tolerable fire interval for the taxon, which is likely to be 5-10 years, increases the risk of seedbank depletion and exhaustion. Further, the increasing frequency, duration and intensity of extreme drought events increases the risk of adult mortality and, particularly, recruitment failure during the early, vulnerable stages of post-fire recruitment.

The taxon may also be susceptible to targeted browsing by native and exotic herbivores, particularly during the early stages of post-fire recruitment.

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:

Ineligible under Criterion A

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There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 71 km² and the Area of Occupancy (AoO) is estimated to be 40 km², but other thresholds under this criterion have not been met.

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 <u>C1</u> or <u>C2</u>				
<u>C1</u>	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)
<u>C2</u>	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				

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Evidence:

Ineligible under Criterion C as Data Deficient

There is no available estimate of total population size for the taxon. However, in 2007, several hundred plants were noted in an area of about 3 hectares beside Muirfoot Track, about 6.5 km from the Cherrypool Road intersection.

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:

Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted. The taxon has a restricted distribution, occurring in a single location, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within a time frame of one or two generations. This is in response to the impact of the identified long-term threats, notably climatic drying and warming coupled with increasing frequency and landscape scale of natural and anthropogenic fire, extreme drought events, and targeted browsing by native and exotic herbivores.

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

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Pultenaea patellifolia*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/4195288d-03c4-48a9-9da5-493d23266e54>