

Pultenaea graveolens Scented Bush-pea

Taxonomy

Pultenaea graveolens Tate

Pultenaea graveolens is sometimes confused with *P. hispidula* but the strong perfume and waxy exudation is very distinctive. Further, the small, ovate, resinous stipules which are not united or appressed to the stem differ from those of *P. hispidula* which are lanceolate, usually partially united and have recurved tips (VicFlora, 2019).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1991).

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

Proposed conservation status

Endangered in Victoria

Criteria A2abce+4abce; B2ab(ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a resinous, strongly perfumed shrub to 1.5 m high; branches pendulous; stems terete, covered with short, spreading hairs. Leaves alternate, ovate (2-)4-25 mm long, 0.5-3 mm wide; apex acute, not pungent; upper surface with pale hairs; lower surface scabrous with tubercle-based hairs, darker than upper surface; margin incurved; stipules c. 1 mm long, boat-shaped with thickened keel, resinous. Flowers axillary toward tips of short, lateral branches; bracts absent; calyx 3-6 mm long, covered with sparse, bristly hairs, usually with a yellow, waxy exudate; bracteoles attached at base of calyx tube, ovate, 1-3.5 mm long, resinous; standard 7-9 mm wide; ovary and most of style densely hairy. Pod ovate, hairy, lower half enclosed by calyx. The taxon flowers in October (VicFlora, 2019).

Generation Length

The generation length of *Pultenaea graveolens* is estimated to be 30 to 35 years. This is based on an estimated pre-settlement fire interval of 30-35 years and the field observation that stands are predominantly single age class indicating that recruitment is predominantly episodic following fire. The taxon is inferred to be a fire-sensitive obligate seed regenerator (OSR) with limited or no capacity to resprout following intense fire.

Distribution

The taxon is rare, known in Victoria from a few areas west of Melbourne (e.g., Brisbane Range, northern Grampians and midland areas between Nagambie and Castlemaine). The taxon also occurs in South Australia (VicFlora, 2019).

The taxon has a highly disjunct distribution throughout its range, with Victorian concentrations in the Mt Difficult Range and the Zumsteins area in the northern Grampians, the Clunes-Dunach district, the Vaughan-Glenlyon district between Hepburn Springs and Castlemaine, the Steiglitz district at the southern end of the Brisbane Ranges and the Greytown-Bailieston district north-east of Heathcote.

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Habitat

The taxon occurs in the shrub understorey of dry Stringybark or Ironbark forest (VicFlora, 2019).

Threats

The taxon suffered significant historic decline through habitat loss to agriculture and habitat degradation during the Gold Rush. Earlier Gold Rush disturbance did not always lead to declines but cumulative land clearance and edge effects on marginal sites resulted in post-1900 declines exceeding 50%. The impact of early post-settlement disturbance was likely to have been mitigated by long-persistent seedbanks.

Current and future threats include *Phytophthora cinnamomi* infection, browsing by macropods, stock and rabbits, extreme soil disturbance, weed invasion by highly invasive transformer weeds such as *Ulex europaeus* (Gorse or Furze), *Genista monspessulana* (Montpellier Broom), *Genista linifolia* (Flax-leaf Broom) and, in some highly scalded sites, *Juncus acutus* (Spiny Rush), recruitment failure due to drought stress, repeat fire events and the combination of these last two threats which can lead to seedbank depletion, exhaustion and local extinction.

In addition, occurrences in fragmented rural landscapes are threatened by incremental habitat loss to agricultural intensification and other management activity.

In its Final Recommendation for listing, the Scientific Advisory Committee (SAC, 1991) summarised the threats to the taxon as follows: "The total population consists of ten discrete, highly localised sites. Some stands have been completely destroyed by infection from the pathogenic fungus *Phytophthora cinnamomi*. *Phytophthora* is the greatest threat to *P. graveolens* having destroyed some stands and posing a threat to others. Inappropriate fire regime (i.e. too frequent burning) is a threat, as is recreational development in the reserve in which *P. graveolens* is found."

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 style="text-align: center;">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:

Eligible under Criterion A2 as Endangered

The population reduction over the past 90 to 105 years is estimated to be 50 to 80% (midpoint 65%), based on (a), (b), (c) and (e) above.

Past decline is based on the impact of the identified threats.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Vulnerable

The population reduction over the past 90 to 105 years is estimated to be 30 to 50% (midpoint 40%), based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 90 to 105 year period, including both past and future (up to 100 years in the future), is estimated to be 50 to 80 (midpoint 65)%, based on (a), (b), (c) and (e) above. The causes of 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 128 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is severely fragmented naturally at the regional and landscape scales and anthropogenically at the landscape scale. All geographically isolated occurrences are separated at spacings exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal.

It is estimated to have 2 locations. It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

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Scented Bush-pea

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 as Data Deficient

There is no available estimate of population size for the taxon although monitoring data and field observations indicate it is likely to be in the tens of thousands.

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 ² 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.

SAC (1991) Scientific Advisory Committee Final Recommendation for listing under the Flora and Fauna Guarantee Act 1988. Nomination No. 26: *Pultenaea graveolens* Scented Bush-pea.



Pultenaea graveolens
Scented Bush-pea

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Pultenaea graveolens*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/69184a12-63a7-4d63-86aa-894d8cb45f67>