Threatened Species Assessment

Pultenaea canaliculata
Coast Bush-pea

Taxonomy

Pultenaea canaliculata 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 B2ab(i,ii,iii,iv,v); C1

Species Information

Description and Life History

The taxon is a rigid, spreading shrub 1-2 m high; stems terete, densely silky-pubescent; leaves alternate, terete, 8-12 mm long, 1-1.5 mm wide; petiole appressed to stem, lamina curved upwards; lower and upper (if visible) surface densely hairy, hairs usually golden; stipules lanceolate, 2-4 mm long, densely hairy, midrib prominent. Inflorescence a terminal cluster of 2-4 flowers, often partially hidden among dense leaves; bracts absent; stipules of floral leaves slightly enlarged; calyx c. 6 mm long, densely covered with pale, usually golden hairs, lobes tapering to long, slender tips; bracteoles attached at base of calyx tube, lanceolate to subulate, c. 6 mm long, usually exceeding calyx, densely hairy; standard 6-7 mm wide; ovary and lower half of style densely hairy. Pod ovate, hairy, enclosed by calyx. The taxon flowers from September to November (VicFlora 2019).

Generation Length

The generation length of *Pultenaea canaliculata* is estimated to be 35 to 50 (midpoint 40) years. This is based on a plausible longevity of 35-40 years and an inference that the taxon is a fire-sensitive obligate seed regenerator (OSR) that is dependent on both rare fire events for mass episodic recruitment at pre-settlement intervals of 50-80 years and sporadic opportunistic recruitment in response to site disturbance events, such as substrate movement (e.g. secondary dune blowouts and erosion gullies on cliffs). 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 scattered and uncommon in Victoria where it is confined to coastal sites from the South Australian border to Wilsons Promontory, such as Portland, Warrnambool, Cape Otway and Sorrento (VicFlora 2019).

Habitat

That taxon is scattered and uncommon on coastal dunes and limestone cliffs (VicFlora 2019). Site data indicates that it is found in coastal habitats typically dominated by *Acacia longifolia* subsp. *sophorae* (Coast Wattle), *Acrotriche affinis* (Ridged Ground-berry), *Adriana quadripartita* (Rare Bitter-bush), *Allocasuarina paludosa* (Scrub Sheoak), *Banksia marginata* (Silver Banksia), *Dianella brevicaulis* (Small-flower Flax-lily), *Gahnia filum* (Chaffy Saw-sedge), *Hibbertia truncata* (Port Campbell Guinea-flower), *Lepidosperma gladiatum* (Coast Sword-sedge), *Leptospermum continentale* (Prickly Tea-tree), *L. scoparium* (Manuka), *Leucopogon parviflorus* (Coast Beard-heath), *Patersonia fragilis* (Short Purple-flag), *Pimelea serpyllifolia* subsp. *serpyllifolia* (Thyme Rice-flower), *Poa*

poiformis (Coast Tussock-grass), *Pomaderris paniculosa* subsp. *paralia* (Coast Pomaderris), *Pultenaea stricta* (Rigid Bush-pea), *Rytidosperma pilosum* (Velvet Wallaby-grass), *Samolus repens* (Creeping Brookweed), *Selliera radicans* (Shiny Swamp-mat), *Spyridium parvifolium* (Dusty Miller) or *Xanthorrhoea australis* (Austral Grass-tree).

The taxon typically occurs at low density with projective foliage cover less than 1%, rarely 1-5% at the quadrat scale, and only exceptionally occurring as a local dominant, with projective foliage cover exceeding 25% at the quadrat scale.

Threats

Historically, the taxon suffered significant decline through habitat loss to agriculture and coastal development, noting that, historically, pastoralists frequently grazed their stock to the foreshore or clifftops.

Current and projected threats include continuing incremental habitat loss and modification in response to agricultural intensification, township expansion and infrastructure development for tourism, and 'sea change' demographic movements of residents attracted by the maritime climate and seascape lifestyle.

In the medium to longer term, however, the taxon is at increasing risk from climatic drying and warming, coupled with increasing frequency and landscape scale of natural and anthropogenic fire. When acting synergistically, the risk of recruitment failure and adult mortality is increased, resulting in seedbank depletion, ultimate seedbank exhaustion and local extinction. The increasing risk of repeat fire events at intervals approaching the tolerable fire interval (TFI) for the taxon, which is likely to be 5-10 years, increases the risk of seedbank depletion and exhaustion, however the current risk of repeat fire at such short intervals in the coastal habitat of the taxon is low. The increasing frequency, duration and intensity of extreme drought events also 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.

A proportion of occurrences occur in highly fragmented rural landscapes or at the exposed margins of remnant stands of native vegetation. These occurrences are at site-specific risk from edge effects, such as stock agistment, weed invasion or land management activities.

A key current and future threat is invasion by exotic transformer weeds, such as *Asparagus asparagoides* (Bridal Creeper), *Dipogon lignosus* (Common Dipogon), *Polygala myrtifolia* (Myrtle-leaf Milkwort) and *Rhamnus alaternus* (Italian Buckthorn), each of which has the capacity to dominate the habitat and significantly modify ecological processes. The taxon is also threatened by invasion of the habitat by the native *Leptospermum laevigatum* (Coast Tea-tree), which is considered indigenous east of Anglesea only.

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 A2 as Vulnerable

The population reduction over the past 105 to 150 years is estimated to be 30 to 40%, based on (c) and (e) above.

The taxon is likely to have experienced significant historic decline in some districts in response to habitat loss to agriculture, and in response to other identified threats across the restricted geographic and ecological range of the taxon.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is projected to be 20 to 30 (midpoint 25)%, based on (c) and (e) above.

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

Eligible under Criterion A4 as Vulnerable

The population reduction over any 105 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 25 to 35 (midpoint 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 88 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the regional and landscape scales. The taxon is also severely fragmented anthropogenically at the landscape scale in some districts. Geographically isolated stands occur at separations exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. The only plausible dispersal agents are ants (myrmecochory) which operate at the metre scale only. This precludes the possibility of recolonisation in the event of local extinction.

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

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:

Eligible under Criterion C1 as Endangered

It is estimated that there are 1,500 to 3,000 mature individuals. This is based on field observations suggesting that typical stands comprise 10-50 (-70) (nominally 30) mature individuals at each of an estimated 50-100 stands or subpopulations.

There is estimated to be a continuing decline of 15 to 30% within two generations.

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.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Pultenaea canaliculata*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/666c4aac-2153-4628-b97e-7f6392747dda