Threatened Species Assessment

Pimelea williamsonii
Williamson's Rice-flower

Taxonomy

Pimelea williamsonii J.M. Black

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria B1ac(iv)+2ac(iv); D

Species Information

Description and Life History

The taxon is a subshrub, 10-30 cm high; young stems densely hairy. Leaves alternate to almost opposite, shortly petiolate, more or less elliptic, 7-15 mm long, 2-4 mm wide, more or less concolorous, mid green, undersurface covered in antrorse hairs, upper surface with fewer finer hairs. Inflorescence terminal, elongate, usually continuous at maturity, to 65 mm long, many-flowered; involucral bracts absent or not differentiated from leaves. Flowers bisexual, brownish, outside covered by short white hairs and long brownish hairs, glabrous inside; floral tube c. 3 mm long, style-portion shorter than ovary-portion, circumscissile above ovary; sepals erect, c. 1 mm long; pedicel hairy; stamens inserted below sepals, almost sessile in throat; anthers opening laterally; style not or little exserted. Fruit dry, enclosed (VicFlora, 2019). The taxon is fire-promoted.

Generation Length

The generation length of *Pimelea williamsonii* is estimated to be 1 to 20 years. This is based on a possible pre-European settlement interval of 20 years between fire events. Although it is an annual or short-lived perennial herb, the taxon is regarded as an obligate seed regenerator which recruits episodically post-fire from long-persistent soil soil-stored seed banks.

Distribution

The taxon occurs in the Hattah Lakes area. It was regarded as extinct in Victoria until several plants were observed in 1990 following a bushfire in 1988. It is also present in South Australia (VicFlora 2019).

Habitat

The taxon mostly grows on light sandy soil in the Hattah Lakes area. There, it grows with *Eucalyptus incrassata, Triodia irritans, Pimelea simplex, Prostanthera microphylla, Hybanthus floribundus, Scleranthus minusculus,* and *Lomandra effusa.* In the Murray Sunset National Park it grows with *Eucalyptus gracilis*, *Haloragis odontocarpus, Aotus subspicata, Cyphanthera myosotidea, Leptospermum coriaceum*, and *Waitzia acuminata*. It has also been collected from an ecotone between mallee woodland and *Callitris verrucosa* shrubland.

Threats

The collecting notes on all post 1990 specimens indicate that the taxon is extremely rare at all sites, with less than 200 plants in total. The small populations size and being usually restricted to small areas is a threat, as small population size presumably also implies more limited genetic variation.

Increasing drying and warming as a result of climate change may lead to more frequent and more intense fires. It is unclear what effect this might have on the taxon and its seedbank. A decline in rainfall as a result of climate change might impact the survival of plants following recruitment after fire.

Similar taxa such as *P. simplex* and *P. trichostachya* are generally unpalatable and are not grazed by stock. *P. simplex* is poisonous to sheep and cattle, and causes St Georges disease in the latter (Cunningham et al. 1981). Presumably *P. williamsonii* is also unpalatable to stock, but it is unclear what effects it has on native herbivores or introduced herbivores such as rabbits and goats.

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:

Ineligible under Criterion A

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

The taxon is estimated to be severely fragmented as some of the subpopulations are separated by distances that are likely to exceed the dispersal range of the taxon, which no specialised mechanism for long-distance dispersal and hence have little demographic or genetic exchange.

It is suspected to have 3 locations and has extreme fluctuations in (iv) above, as it is an obligate seed regenerator which recruits episodically post-fire. Successive cohorts are likely to vary in populations size at an order of magnitude in response to fire intensity and recruitment failure.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 32 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 3 locations, and has extreme fluctuations 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 as Data Deficient

The taxon is estimated to have 150 to 180 mature individuals, but other thresholds under this criterion have not been met.

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 D as Endangered

The taxon is estimated to have 150 to 180 mature individuals. This is based on the population notes provided on MEL specimens, as there have been no dedicated surveys for this taxon.

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

References

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. (1981). *Plants of western New South Wales.* Soil Conservation Service of N.S.W.

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 (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Pimelea williamsonii*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/22730c10-75ab-433f-bb55-3e1dabc99414