Threatened Species Assessment

Pimelea spinescens subsp. *pubiflora*
Wimmera Rice-flower

Taxonomy

Pimelea spinescens subsp. *pubiflora* Rye

The taxon is distinguished from the type subspecies by its hairy pedicels, and its pale to bright lemon-yellow flowers which are hairy on the outside.

Current conservation status

Listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Pimelea spinescens* (SAC 1996).

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

Proposed conservation status

Critically Endangered in Australia

Criteria A2abce+3ce+4abce

Species Information

Description and Life History

The taxon is a deeply taprooted, long-lived subshrub 5-30 cm high (rarely more); stems glabrous, spinescent. Plants mostly dioecious. Tips of branches and short-shoots often leafless and tapered to a weak point. Leaves opposite, shortly petiolate, narrowly elliptic or elliptic, 2-10 mm long, 1-3 mm wide, more or less concolorous, green, glabrous. Inflorescence terminal, often on a very short lateral branchlet, a compact head of 6-12 flowers; male inflorescences erect; female inflorescences nodding; involucral bracts leaf-like, 4, sessile, narrowly to broadly elliptic, 3-7 mm long, 1.5-4 mm wide, glabrous, green, often subtended by smaller, sometimes minute, bracts. Flowers unisexual (rarely hermaphrodite), pale to bright lemon yellow, shortly appressed-hairy outside, glabrous inside; floral tube 1.5-3 mm long, style-portion of female flowers shorter than ovary-portion; sepals c. 1-2 mm long; pedicel shortly appressed-hairy; stamens shorter than sepals; anthers opening laterally or somewhat laterally. Fruit dry, enclosed, floral tube circumscissile above ovary. The taxon flowers from June to July (VicFlora 2017).

Generation Length

The generation length of *Pimelea spinescens* subsp. *pubiflora* is estimated to be 50 to 100 years. This is based on a plausible longevity of 50-100 years or more, the demonstrated ability of the type subspecies (and therefore by inference this subspecies) to resprout from a deep taproot following fire, browsing or other disturbance events, and the inference from related taxa that the taxon recruits both episodically following fire or other disturbance events, and also opportunistically in response to localised disturbance events.

Distribution

The taxon was believed to be extinct until it was recollected in grassy Buloke woodland near Natimuk, Minyip, and Kalkee in the Wimmera. Prior to its rediscovery in the 1980s, it had not been collected since 1901 where it was known from the Dimboola and Borung districts (VicFlora 2017).

Habitat

The taxon is known only from grassy Buloke woodland (VicFlora 2017). At Lake Road north of Natimuk, the habitat is remnant roadside grassland dominated by *Rytidosperma caespitosum*, *Austrostipa nodosa*, *A. eremophila*, *Pimelea spinescens* subsp. *pubiflora, Pimelea glauca*, *Vittadinia* taxa, *Arthropodium fimbriatum*, *Dianella* aff. *admixta, Bursaria spinosa,* and *Senna artemisioides,* on sandy loam with some limestone nodules.

On the northern outskirts of the Minyip township, the habitat is a degraded grassy Buloke (*Allocasuarina luehmannii*) woodland, growing on 'rises' beside gilgais, in association with *Pimelea glauca*, *Mentha satureoides*, *Walwhalleya proluta*, *Panicum decompositum*, *Enteropogon acicularis,* and *Austrostipa aristiglumis*.

Threats

All known occurrences of the taxon represent remnant stands within small areas of remnant vegetation in highly fragmented rural landscapes. These are threatened by road management activity; fuel reduction activity including fuel reduction burning at intervals well below the tolerable fire interval for the taxon; ploughing of mineral earth fire breaks; weed invasion; browsing and trampling by roadside stock agistment or stock grazing on freehold land; agricultural intensification including cropping and off-target herbicide application; soil eutrophication through fertilizer application; hydrological modification through road drainage works; slashing of remnant vegetation; and the increasing risk of adult mortality and recruitment failure in response to extreme drought stress, resulting in seedbank depletion, exhaustion, and ultimately local extinction. The taxon may also be threatened by inbreeding depression, although this risk has not been demonstrated in this or the type subspecies.

Within a year of the discovery of the taxon at Lake Road north of Natimuk in 2005, hundreds of plants, of an estimated 3,000, were damaged or destroyed by 6 m wide spoon drain works with crushed limestone resurfacing of part of the road verge. Within a year of discovery of the Minyip occurrence in 2007, the stand was severely damaged by slashing of the remnant vegetation.

In 2017 a solitary female plant was discovered on a roadside at Kalkee 20 km NNE of Horsham. Apart from all the other existential threats to this isolated individual, it is now unable to be pollinated since it is undoubtedly too isolated from any male plants and is beyond the dispersal range of the suspected moth pollen vector.

The Beauglehole specimen taken in 1986 from the road reserve along the Dimboola-Minyip Road is likely to have been collected within a few kilometres of the Henty Highway, since this is the only section of the road to still support remnant Buloke Woodland. All other sections of the Dimboola-Minyip Road have been cleared for many decades and are very unlikely to have supported the taxon in 1986. This stretch of roadside has been searched without success, suggesting the taxon has become locally extinct in the last 30 years.

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 Critically Endangered

The population reduction over the past 150 to 300 years is estimated to be 95 to 99%, based on (a), (b), (c) and (e) above.

Past reduction is based on the almost complete loss of habitat to agriculture in the immediate vicinity of each known historic or recent record of the taxon, and across the Western Wimmera generally.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is projected to be 80 to 95%, based on (c) and (e) above.

Future decline is based on the projected impact of the numerous identified threats, any one of which could result in local extinction.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 150 to 300 year period, including both past and future (up to 100 years in the future), is estimated to be 99 to 100%, 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 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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 157 to 264 km², and the Area of Occupancy (AoO) is estimated to be 12 to 16 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented, has 1 location, and has a continuing decline in (i), (ii), (iii), (iv), and (v) 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:

Eligible under Criterion C1 as Endangered

It is estimated that there are 2,000 to 3,000 mature individuals. This is based on an estimate of 3,000 plants at Natimuk when first discovered in 2005, prior to roadworks which damaged or destroyed several hundred plants. A single plant was recorded at Kalkee in 2017. Population size at Minyip was estimated to be 150-250 plants at the time of discovery in 2007, but the impact of slashing only months later is undocumented.

There is estimated to be a continuing decline of 95 to 100% 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 D 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 (1996). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 391 *Pimelea spinescens*. Department of Environment and Primary Industries, Victoria.

VicFlora (2017) Flora of Victoria, Royal Botanic Gardens Victoria: *Pimelea spinescens* subsp. *pubiflora.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/754aa246-9de3-4cd5-91be-9367fbd07d07