Threatened Species Assessment

Zieria veronicea subsp. *veronicea*
Pink Zieria

Taxonomy

Zieria veronicea subsp. *veronicea* (F. Muell.) Benth.

There are two subspecies of *Zieria veronicea*, with subsp. *insularis* endemic on Kangaroo Island, South Australia (VicFlora 2016(.

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 A3ce+4ce; B2ab(iii,v)

Species Information

Description and Life History

The taxon is a shrub to 60 cm high, somewhat lemon-scented when young growth crushed, densely stellate-velvety indumented throughout; branches eglandular, not ridged, older branches glabrescent. Leaves simple, oblong to ovate, 5-18 mm long, 1-5.5 mm wide, obtuse, upper surface light green, lower surface grey-green, margins entire, recurved to revolute; petiole 0-0.7 mm long. Inflorescence 1-3-flowered, generally not exceeding leaves. Sepals narrowly lanceolate, 2-5.5 mm long, acute, densely stellate-hairy, smooth; petals 2.3-7 mm long, pink or occasionally white, often drying to light purple, imbricate; ovary stellate-pubescent. Follicles velutinous with a dense stellate indumentum, small terminal appendage present; seeds 3-3.5 mm long, mottled black, rugulose to striated. The taxon flowers August to December (VicFlora 2016).

Generation Length

The generation length of *Zieria veronicea* subsp. *veronicea* is estimated to be 25 to 50 years. The taxon is likely to recruit prolifically from a long-persistent soil-stored seedbank following intense wildfires at pre-settlement intervals of 25-50 years or more with sporadic recruitment in response to localised site disturbance events.

The taxon is likely to persist in the seedbank even after each cohort has died.

This is supported by the Vital Attributes dataset which suggests that, for congeneric species, the taxon does not resprout post-fire, maintains a long-lived seedbank with complete germination after fire, that time to reproductive maturity is likely to be 5-10 years and that life span, including seedbank, is up to 20-50 years or more (DELWP 2015).

Distribution

The taxon is restricted in Victoria to the Little Desert in the Western Wimmera, from the South Australian border east to Dimboola, with southern outliers in the Jilpanger Nature Conservation Reserve and west of Casterton, and with highly disjunct occurrences around the Gippsland Lakes in the east of the state. Also in South Australia and Tasmania (VicFlora 2016).

Habitat

In western Victoria the taxon is widespread in sandy mallee and mallee-heath communities. Around the Gippsland Lakes in eastern Victoria the taxon occurs in sandly lowland heaths (VicFlora 2016).

Threats

The taxon is threatened in all districts by increased fire extent and frequency combined with climatic warming and drying which, synergistically, increase the risk of recruitment failure due to repeat fires at intervals below or approaching the tolerable fire interval (TFI) for the taxon and extreme drought stress. This threat is particularly acute in the Little Desert National Park which has been subjected to imposed fuel reduction burning at such high frequency in recent decades that highly fire-sensistive obligate seed regenerators (OSR) such as the iconic and dominant *Banksia ornata* (Desert Banksia) have been eliminated from large swathes of the park. The taxon is likely to be at particular risk of adult mortality and recruitment failure in response to extreme and extended drought events, noting that it typically occupies free-draining sandy soils. The taxon may also be threatened by targeted browsing by goats and other herbivores in the western Wimmera and, potentially, by Hog Deer or Sambar in eastern Victoria, particularly during early stages of post-fire recruitment. This risk has a precedent in the Gippsland region where Sambar have targeted another member of the Rutaceae, the Yellow-wood *Acronychia oblongifolia*. (Bilney 2013).

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 A3 as Endangered

The population reduction over the next 75 to 100 years is projected to be 30 to 60 (midpoint 45)%, based on (c) and (e) above.

An estimate of future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 75 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 35 to 75 (midpoint 50)%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Some historic decline may have occurred on the northern fringes of the Little Desert and in nearby rural districts south of the Big Deserts such as Telopea Downs and Yanac through habitat loss to intensive agriculture. This is supported by historic collections in these largely cleared rural districts.

An estimate of future decline is based on the projected impact of the identified threats.

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 232 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 naturally at the regional and landscape scales with seed dispersal largely at the metre scale by ants (myrmecochory) which are the only plausible dispersal agents. Like most indigenous members of the Rutaceae, individuals tend to occur in well defined stands with abrupt boundaries, suggesting highly localised dispersal of seed.

Two locations can be identified, one in the Western Wimmera (and near Casterton) and one in the Gippsland Lakes district in eastern Victoria, each of which are highly disjunct and subject to distinct landscape contexts, local climate, vegetation types and site-specific threats.

It has a continuing decline in (iii) 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:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals. No reliable estimate of the total population size for the taxon is available.

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

Bilney, R. (2013). Antler rubbing of Yellow-wood by Sambar in East Gippsland, Victoria. *Victorian Naturalist* 130:68-74.

DELWP (2015) Data source: 'Victorian Flora Vital Attributes dataset'. Department of Environment, Land, Water and Planning, Victoria.

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 (2016). Flora of Victoria: *Zieria veronicea* subsp. *veronicea*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b1a2e044-1c79-4605-95aa-184da3ffc293