



Zieria smithii Sandfly Zieria

Taxonomy

Zieria smithii Jacks.

Several distinctive local forms are known and infraspecific taxa are sometimes recognised, but the current concept of the species includes these in a single variable entity. A population on Genoa Peak has leaflets that are exceptionally small (10-20 mm long and 1-3 mm wide), and flowers in short congested cymes (VicFlora 2020).

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(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is an erect, usually spindly shrub to c. 2 m high; branches slightly ridged when young, warted, glabrescent. Leaves trifoliolate; leaflets narrow-elliptic, oblong or lanceolate, 18-54(-73) mm long, 4-9 mm wide, acute, discolorous, dotted with raised oil glands, glabrous except for few stellate hairs along midvein, margins entire, slightly undulating, somewhat to strongly recurved; petiole 10-16 mm long. Inflorescence usually shorter than the leaves, 7-60-flowered. Sepals deltoid, 1-1.5 mm long, glabrous to hirsute, tuberculate; petals 2-4 mm long, usually white, rarely pink, imbricate, pubescent; ovary glabrous. Follicles somewhat warted, glabrous, usually with a small terminal appendage; seed c. 2.5 mm long, reddish-brown to black, striated. The taxon flowers in Spring and Autumn. (VicFlora 2020).

Generation Length

The generation length of *Zieria smithii* is estimated to be 35 to 70 years. The taxon is likely to recruit prolifically from a long-persistent soil-stored seedbank following intense bushfires at pre-settlement intervals of 35-70 years or more with sporadic recruitment in response to localised site disturbance events. It 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 rather rare in Victoria where it is restricted to coastal and inland districts in Central and East Gippsland, occurring discontinuously from Billy Goat Bluff in the Alpine National Park and the Briagolong district east to the New South Wales border. It also occurs in Queensland and Tasmania.

Habitat

The taxon is usually found on dry rocky ground, often on rainforest margins, riparian scrub, or on open rocky outcrops (VicFlora 2020). The altitudinal range of the taxon in Victoria is from seal level to 1340 m at Billy Goat Bluff.

Threats

The taxon is threatened in all districts by increased fire frequency, intensity and landscape scale, 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 for the taxon, and extreme drought stress. 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 often occupies shallow to skeletal soils on dry rocky ground or on open rocky outcrops (VicFlora 2020). The taxon is also threatened by targeted browsing by Sambar deer (*Rusa unicolor*), particularly during early stages of post-fire recruitment. This risk has a precedent since Sambar have targeted another member of the Rutaceae, the Yellow-wood *Acronychia oblongifolia*. (Bilney 2013), both taxa occurring in association with Warm Temperate Rainforest and their ecotones. Sambar have been undergoing explosive increases in population density throughout the Central and East Gippsland regions in recent decades and have almost eliminated many mature and regenerating stands of *Acronychia oblongifolia* across its Victorian range. A proportion of the habitat of the taxon was consumed by the catastrophic wildfires of 2019-2020. The impact of these fires on stands of the taxon and its post-fire recovery are unknown.

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>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 A3 as Endangered

The population reduction over the next 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 105 to 210 year period, including both past and future (up to 100 years in the future), is estimated to be 35 to 65% (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 Teloepa 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 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 248 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.

Three locations can be identified based on significant differences in elevation, local climate, vegetation types and fire regime: one for occurrences in East Gippsland, one for occurrences in Central Gippsland between Briagolong and the Mitchell River and one for the disjunct occurrence at Billy Goat Bluff in the Alpine Region.

It 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:

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 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

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

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