Threatened Species Assessment

Rhagodia ulicina
Spiny Goosefoot

Taxonomy

Rhagodia ulicina (Gand.) Paul G. Wilson

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 A2bce; B2ab(ii,iii,iv)

Species Information

Description and Life History

The taxon is a densely divaricately branched shrub to c. 1 m high, each branch terminated by a slender spine. Leaves alternate, shortly petiolate, fleshy, elliptic to obovate, 3-5 mm long, 1-3 mm wide, dull green to greyish from a sparse to very dense covering of vesicular hairs. Inflorescence few-flowered, with flowers clustered or solitary along terminal branches; perianth globose, 1-1.5 mm diam., densely mealy on outer surface. Berry to c. 2 mm diam., initially enclosed by enlarged fruiting perianth; fleshy pericarp not always developed; seed c. 1.5 mm diam., smooth or slightly granular. The taxon flowers mostly from August to November (VicFlora 2017).

The taxon may be found in relatively dense local stands but more often occurs as scattered plants. The taxon is not observed to be grazed to any extent and tends to lose its leaves in extended dry periods. It also emits a fetid odour when placed in a confined space, as do most of the goosefoots (Cunningham et al. 1992).

Generation Length

The generation length of *Rhagodia ulicina* is inferred to be 25 to 50 years. Generation length is based on suspected longevity of 15-25(-50) years and on field observation of the related *R. spinescens*, which can germinate easily within 2-5 weeks. Seed recruitment at Carwarp and in NSW in Belah Woodlands has been observed, however the germination cue is unknown.

Distribution

The taxon is localised in the northern part of the Sunset Country (north and north-west of Hattah), but is locally common (VicFlora 2017).

Habitat

The taxon is known to occurr on red loamy soils which have been preferentially cleared for prime agriculture, usually containing limestone, in dune swales and on flat ground (VicFlora 2017). The Dimboola records associated the taxon with *Allocasuarina luehmannii, Avena fatua, R. ulicina,* the record east of Lake Hindmarsh associated with *Euc. oleosa, E. costata, E. dumosa, Zygophyllum aurantiacum, Senna artemisioides* subsp. *petiolaris, R. spinescens* and *R. ulicina*.

Threats

Threats to small, isolated subpopulations are not likely to result in significant future decline in total population since the larger stands are not at immediate or projected risk and recruitment may be enhanced by La Nina events. This may compensate for increasing risk of mortality or recruitment failure due to extreme drought as experienced during the Millennium Drought.

Key threats to small isolated occurrences in fragmented landscapes include incremental habitat loss to road management and, to a lesser extent, agricultural intensification. The taxon is not considered threatened by fire management since habitats are not fire-prone or fire-promoting. Weed invasion and weed competition for recruiting populations pose a minor threat. It should be noted that a few occurrences are in competition with key exotics, since many habitats are calcareous sites not typically subject to weed invasion with the exception of *Carrichtera annua* (Wards Weed).

Mortality due to grazing or extreme drought is not considered a major threat since the taxon is well adapted to resist both threats, as noted at Carwarp where it is a dominant taxon and often locally forms a monoculture.

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 Endangered

The population reduction over the past 75 to 150 years is estimated to be 50 to 75%, based on (b), (c) and (e) above.

Past decline is based on habitat loss since 1918. It should be noted that the taxon prefers loamy soils which have been preferentially cleared for prime agriculture, although significant stands survive in Morkalla, Yatpool and the northern Raak Plain districts.

The causes of the 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 255 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 at the landscape scale due to anthropogenic habitat loss and habitat fragmentation. The taxon has negligible capacity for recolonisation in the likely event of local extinction of individual subpopulations.

It is estimated to have 2 locations. It has a continuing decline in (ii), (iii) and (iv) above based on the identified threats such as road management and, to a lesser extent, agricultural intensification.

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.

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 inferred 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 (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Rhagodia ulicina.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/a0faa6c8-447f-47f9-856f-2775ef3c5473

Walsh, N.G. (1996). Aizoaceae. In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae.* Melbourne: Inkata Press.