Threatened Species Assessment

Roepera billardierei
Coast Twin-leaf

Taxonomy

Roepera billardierei DC.

All Australian *Zygophyllum* are now included in the genus *Roepera* (Beier *et al*. 2003).

Taxonomic status: Homotypic synonym. Accepted name: *Roepera billardierei* (DC.) G.Don (VicFlora 2019).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(ii,iii,v)

Species Information

Description and Life History

The taxon is a scrambling or ascending perennial herb or subshrub 30-60 cm high; stems slender, to c. 2 m long, sometimes climbing over taller plants. Leaves 15-45 mm long, green; leaflets articulate at base or continuous with petiole, oblong-elliptic to elliptic, 10-30 mm long, (3-)4-12 mm wide, fleshy, apex rounded or truncate; common petiole narrow. Sepals 4, ovate-lanceolate, 5-9 mm long, deflexed or spreading in fruit; petals 4, obovate-cuneate, 8-15 mm long, apex rounded to emarginate, bright yellow; stamens 8, filaments subulate, lacking wings. Fruiting pedicels 5-15 mm long; fruit a 4-angled loculicidal capsule, obconical, 10-12 mm long, drooping, abruptly truncate at apex with a short, blunt appendage at the upper corner of each angle and a persistent style; seeds 1 or 2 per cell. Flowers mostly June-December (VicFlora 2019).

Generation Length

The generation length of *Roepera billardierei* is inferred to be 10 to 40 years. Other *Roepera* taxa that grow to shrubs have been reported to be 88 years old (Moore and Bhadresa 1978). However, given that *R. billardierei* is a succulent herb it is expected to mature more quickly and have a shorter lifespan, perhaps no longer than 40 years, and so the generation time is expected to be probably between 10 and 40 years.

Distribution

In Victoria the taxon occurs in coastal areas from Discovery Bay in the west of the state east to the Mornington Peninsula, with outlying occurrences on the islands west of Wilsons Promontory and inland near Bacchus Marsh.

Habitat

The taxon occurs in scrubby vegetation on coastal dunes and around limestone cliffs or in drainage lines.

Threats

Erosion of coastal habitats from sea-level rise is the main threat to the taxon. Additional threats include trampling and erosion of sites due to human traffic to beaches, herbivory by introduced animals such as snails and rabbits,

competition from weeds, residential expansion in coastal areas such as at Barwon Heads, Torquay, and Sorrento, and accidental spraying controlling weeds, such as for boxthorn control.

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

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

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 220 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

It is estimated to have 2 locations, namely sites along the coast, and inland sites. Inland sites are not exposed to all the threats associated with coastal sites such as coastal erosion, coastal weeds, and human beach-related recreation.

It has a continuing decline in (ii), (iii) and (v) above based on the current and projected impact of the identified threats, especially those associated with sea-level rise which is expected to continue in the future due to increases in average global temperature.

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 are almost no estimates available for the number of individuals of the taxon at sites of occurrence.

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

Beier, B.A., Chase, M.W. and Thulin, M. (2003). Phylogenetic relationships and taxonomy of subfamily Zygophylloideae (Zygophyllaceae) based on molecular and morphological data. *Plant Systematics and Evolution* 240: 11-39.

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

Moore, P.D. and Bhadresa, R. (1978). Population structure, biomass and pattern in a semi-desert shrub, *Zygophyllum eurypterum*, in the Turan Biosphere Reserve of North-Eastern Iran. *Journal of Applied Ecology* 15: 837-845.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria. *Roepera billardierei*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b1c45fa0-9e12-4063-92a5-b9d8bde5fba8