



Bergia trimera Small Water-fire

Taxonomy

Bergia trimera Fisch. & C.A. Mey.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(iii,v)c(iv)

Species Information

Description and Life History

The taxon is a prostrate or procumbent annual, forming loose mats to c. 20 cm diam.; stems sparsely septate-hairy. Leaves sessile, ovate, obovate or oblanceolate, 5-20 mm long, 2-6 mm wide, often glaucous; margins distantly serrulate. Flowers sessile to shortly pedicellate, densely clustered in axils; sepals 3(-4), narrowly ovate, c. 1 mm long, midrib slightly thickened, green, margins thin, entire or somewhat toothed toward apex, white or purplish; petals slightly longer and broader than sepals, pink, membranous; stamens and styles as many as other segments. Capsule globular, purplish-brown, slightly exceeding perianth. Seeds cylindric, c. 0.4 mm long, patterned by raised reticulations. The taxon mainly flowers from January to April (after summer floods) (VicFlora 2018).

Generation Length

The generation length of *Bergia trimera* is estimated to be 1 to 25 (likely 5) years. The taxon is a short-lived, annual herb which recruits episodically following flood events at intervals which are likely to have been highly dependent, at the time of European settlement, on each river system and component of that system. Some sites are likely to have been subject to reliable flooding almost annually, whilst others may have been flooded at decadal intervals only. Billabongs and anabranches of the Murray River are likely to have been flooded regularly, whereas lakes disconnected from the river floodplain are likely to have flooded at less frequent intervals.

Distribution

In Victoria, the taxon is rare and is confined to floodplains of the Murray River in the far northwest (Red Cliffs, Lake Wallawalla), and areas prone to inundation near Kerang. The taxon was first collected in Victoria in 1982, and it is rarely observed in the absence of recent floods. It has been recently collected at Lake Powell near Robinvale, and at three sites in the Kerang district: Koorangie Game Reserve, 'Wanderers Plain' Trust for Nature Reserve, and Leaghur State Park. It is found in all mainland states, as well as in India and Sri Lanka (VicFlora 2018).

Habitat

The taxon occurs on moist, recently inundated sandy clay soils. Seedbanks remain dormant awaiting floods, restricted in the floodplain environment to the ecotonal herbaceous zone in shallow deflation lake basins (i.e. basins formed primarily by wind erosion, especially in arid or semiarid regions). Seed germinates on sandy substrates on recession of flood waters at the edge of deflation lake beds, typically only on the south and south-west edge.

Threats

The taxon is threatened by any disruption to the hydrological stability of its specialised habitat. Key threats to the ephemeral floodplain habitat include river regulation resulting in salinisation, flood surges in deflation lake beds, and reduced frequency of flood events.

The taxon is a habitat specialist, restricted in the floodplain environment to the ecotonal herbaceous zone in shallow deflation lake basins, between Hattah and Lake Wallawalla. In this area, there are only a few deflation lake basins, namely at Hattah Lakes (Nangiloc to Red Cliffs) where they are very salt affected, and at Lake Wallawalla. The taxon is likely to be lost from Karadoc Swamp and Kings Billabong, due to river regulation resulting in salinisation.

The suitable habitat at Victorian sites is only 5 m wide, typically only on the south and south-west edge of lake beds. This is because wave effects disrupt the ecotone on the east side.

Evidence of declining frequency of flood events is illustrated by Lake Wallawalla, which flooded 3 times in 4 years at the time of settlement, but now floods only 3 times in 20 years, namely in 1995/96, 2000 and 2010/11.

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 style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (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

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 B1 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 11,38 km², based accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented both naturally and anthropogenically, at the subregional and landscape scales. All known records occur at spacings greatly exceeding the dispersal range of the taxon. Unlike many wetland plants, the taxon is unlikely to be dispersed by either floodwaters or water birds, since the seed is not obviously adapted for dispersal. This precludes the possibility of recolonisation in the event of local extinction.

Two locations can be identified: one for occurrences connected to the Murray River itself, and a second for occurrences such as Koorangie Game Reserve, Wanderers Plain, and Leaghur State Park near Kerang (which are on the floodplain of the Avoca River). The identified threats are likely to operate somewhat independently or with different intensities in each of these locations.

It has a continuing decline in (iii) and (v), based on the current and projected impact of the identified threats, including river regulation resulting in salinisation, flood surges in deflation lake beds, as well as the reduced frequency of flood events.

It is subject to extreme fluctuation in population size and density between each successive recruitment event, in response to seasonal conditions and contrasting flood levels and duration.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 65 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, it is severely fragmented, has 2 locations and has a continuing decline in (iii) and (v).

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 no available estimate of current population size for the taxon. Any estimate would be misleading, since population size and density are subject to extreme fluctuation between successive recruitment events in response to seasonal conditions and contrasting flood levels and duration.

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

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



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VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Bergia trimeria*. Retrieved from:
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