Threatened Species Assessment

Ranunculus diminutus
Brackish Plains Buttercup

Taxonomy

Ranunculus diminutus B.G. Briggs

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 A2ce+3ce+4ce; B2ab(ii,iii,iv,v)

Species Information

Description and Life History

Brackish Plains Buttercup is a stoloniferous perennial, mostly 2-5(-c. 10) cm high. Leaves tufted at base; petioles mostly 1-5 cm long; lamina trifoliolate, c. 1-2 cm long and wide, glabrous or sparsely pilose beneath, segments oblong to narrowly elliptic, entire or with 1 or 2 narrow lobes, 1-2.5 mm wide. Flowering stems erect, subequal to leaves, usually 1-flowered; sepals 5 or 6, spreading, ovate to broadly elliptic, 3-5 mm long, glabrous or with a few scattered hairs; petals 5-11, oblong, 3.5-5.5 mm long, 0.5-1.5 mm wide, yellow, glossy; nectary lobe largely fused to petal, obtuse, truncate or shallowly emarginate, c. 0.5 mm long overall; stamens c. 15-30. Achenes usually 10-20, flattened-obovoid, 1-2 mm long, smooth or obscurely wrinkled; beak slender, c. 1 mm long, erect; receptacle hispid between achenes, glabrous or almost so in the staminal zone. The taxon flowers from September to February (VicFlora 2018).

Generation Length

The generation length of *Ranunculus diminutus* is estimated to be 15 to 50 (midpoint 25) years. The taxon is a stoloniferous perennial herb which is likely to recruit sporadically rather than episodically in response to localised disturbance events such as animal digging or in response to inundation, fire or optimal rainfall events from a soil-stored seedbank at intervals likely to be determined by La Nina cycles. Longevity is potentially indefinite since the taxon perennates by stoloniferous runners. Fire is likely to be frequent in the landscape, but with less frequent penetration into wetland habitats. The taxon is likely to resprout following low intensity fire and other disturbance events, but is killed by intense fire.

Distribution

The taxon is uncommon to rare in Victoria and has recorded only from the shores of Lake Omeo in the east and Lakes Corangamite, Goldsmith and Kennedy in the west (between Colac and Hamilton). It also occurs in South Australia, New South Wales and Tasmania (VicFlora 2018).

The taxon extends across the Victorian Western Basalt Plains from the Hamilton district in the west to the northern outskirts of Melbourne at Craigieburn in the east and from the Beaufort district in the north almost to the coast on the Sherbrook River in the Port Campbell National Park. East of Melbourne, it is restricted to the shores of Lake Omeo at Benambra in the Victorian Alpine region. There is also an unvouchered 2019 site record for Lake Wallace in Edenhope, only 30 km from the South Australian border.

Habitat

The taxon is recorded only from seasonally wet clay soils fringing lakes (VicFlora 2018) in an elevated intermontane basin or in the lowlands on the Victorian Volcanic Plain. It extends beyond lake margins to swamps and wetlands fringing streams and other water bodies.

It is a habitat specialist restricted to sites of high fertility, moderate salinity (brackish) and deep, waterlogged soils which are amongst the most susceptible to weed invasion in the state. All Victorian records are for small remnant stands of native vegetation in highly fragmented rural landscapes, all of which are severely degraded by edge effects. The recorded sites include a wide array of invasive exotic weeds comprising a substantial proportion, and often a majority, of all recorded taxa. However the taxon remains a significant component of the flora of these specialised habitats, sometimes identified as gilgais, often co-dominating or even dominating the herb-rich habitat with projective foliage cover of 25-50% at the quadrat scale.

Threats

The taxon has suffered significant historic decline through habitat loss to agriculture throughout its Victorian range. All Victorian records are for small remnant stands of native vegetation in highly fragmented rural landscapes, all of which are severely degraded by edge effects. This is evidenced by all quadrat samples recording a wide array of invasive exotic weeds comprising a substantial proportion, and often a majority, of all recorded taxa. The taxon is a habitat specialist restricted to sites of high fertility and deep, waterlogged soils which are amongst the most susceptible to weed invasion in the state. All sites are threatened with continuing habitat degradation through agricultural intensification including extension of cropping, wetland drainage, basalt harvesting, vehicle traffic, infrastructure maintenance, fire management activity, stock agistment, site conversion to woodlot and farm forestry and large-scale plantation establishment.

Perhaps the most significant current and future threat is weed invasion of small remnant stands of native vegetation supporting the taxon, particularly by exotic annuals and perennials such as *Chamaemelum nobile* (Common Chamomile), *Cotula coronopifolia* (Water Buttons), *Hainardia cylindrica* (Common Barb-grass), *Hordeum hystrix* (Mediterranean Barley-grass), *H. marinum* (Sea Barley-grass), *Juncus acutus* (Spiny Rush), *Melilotus indicus* (Sweet Melilot), *Parapholis incurva* (Coast Barb-grass), *P. strigosa* (Slender Barb-grass), *Phalaris aquatica* (Toowoomba Canary-grass), *Plantago coronopus* (Buck's-horn Plantain), *Polypogon monspeliensis* (Annual Beard-grass), *Puccinellia fasciculata* (Borrer's Saltmarsh-grass), *Sonchus asper* (Rough Sow-thistle), *Trifolium fragiferum* (Strawberry Clover), *T. ornithopodioides* (Bird's-foot Clover) and *Vulpia* species (Fescue). Each of the listed exotics occurs in at least one quadrat sample with projective foliage cover of at least 5-25% at the quadrat scale.

The taxon may be palatable to stock, rabbits and native herbivores, however, this threat is overshadowed by the physical disturbance to the fragile wetland habitat of the taxon by exotic herbivores, particularly hard-hooved herbivores such as cattle, sheep, horses and deer, all of which pug the gilgai formation often associated with the taxon. Feral pigs can also excavate the soil in wetland and moist grassland and herbfield habitats in search of roots, rhizomes, tubers and other storage organs.

The taxon is also threatened in the longer term by climatic drying, which is projected to reduce the reliability of winter rainfall events, reducing the extent and quality of available habitat and increasing the risk of seedbank depletion, recruitment failure and local extinction.

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 45 to 150 years is estimated to be 50 to 80% (midpoint 65%), based on (c) and (e) above.

The taxon is likely to have suffered very significant historic decline through habitat loss to agriculture across the entire Victorian range.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Endangered

The population reduction over the next 45 to 100 years is estimated to be 50 to 80% (midpoint 65%), 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 45 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 60 to 80% (midpoint 70%), based on (c) and (e) above. The causes of 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) is estimated to be 184 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is severely fragmented naturally at the regional and landscape scales and anthropogenically at the landscape scale with the taxon likely to be dispersed by water or small mammals at the 100 m to kilometre scale. The taxon may also be dispersed by waterbirds at the landscape scale.

It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

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 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)

VicFlora (2018) Flora of Victoria, Royal Botanic Gardens Victoria: *Ranunculus diminutus*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/c1dbc2e5-62c9-4446-9aaf-6aa63e6e3225