

Nymphoides geminata Open Marshwort

Taxonomy

Nymphoides geminata (R. Br.) Kuntze

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 A2c+3c; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a perennial or annual; stems to 1 m long, floating, stoloniferous, often reduced to a few cm long on stranded plants. Petioles of basal leaves 1–60 cm long; blades c. circular or very broadly ovate, entire, deeply cordate, 1–6 cm long. Flowers homostylous, in spaced pairs along a short inflorescence or the pairs loosely clustered on plants growing on mud; calyx 3–6 mm long; corolla 12–25(–33) mm diam., lobes 5(–6), with broad lacinate wings, not keeled; stigmas 2, sometimes 3. Capsule 3–6.5 mm long, c. equal to calyx; seeds globular to slightly ellipsoid-globular, somewhat laterally compressed, 0.6–1 mm long, black when mature, usually with prominent spaced obtuse tubercles, sometimes smooth; caruncle circular, pale. Flowers and fruits mostly October–May (VicFlora 2018).

It is an obligate aquatic, herbaceous plant, with leaves floating on the water surface and emergent flowers. It occurs in water to 40 cm deep and reproduces by seed only, with a soil-stored seedbank of unknown longevity. The seedbank allows recovery of the population on the replenishment of water in the wetland after a period of dryness. Flowers are pollinated by insects for a pollen reward, and solitary bees are probably the main pollinators. The breeding system is unknown, whether self-fertile or an obligate outcrosser, but seed is assumed to be dispersed by water. It is doubtless that waterbirds must be able to disperse seeds as evidenced by its wide distribution in Australia, New Guinea, and New Zealand.

Generation Length

The generation length of *Nymphoides geminata* is suspected to be 10 to 20 years. This is based on the taxon's longevity and opportunistic recruitment, and the intermittent unsuitability of habitat because of wetland drying.

Distribution

The taxon is widespread in the east of the state, with a concentration of collections and records on the Gippsland Plain.

Habitat

The taxon occurs in open permanent and seasonal freshwater swamps, streams, and rockpools, from near sea level to c. 1000 m above sea level on a range of mostly fertile substrates.

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Threats

Threats to the taxon include the effects of climate change such as decreased rainfall, increased evaporation, extreme temperatures, and decreased frequency, amplitude and duration of flooding, as well as eutrophication of wetlands, damage to hydrology, soils and plants by cattle, deer, feral pigs, and horses, river regulation and diversion, weed invasion including both aquatic plants and dryland plants using excess water thus depriving wetlands, and shading of aquatic habitats.

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> <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:

Eligible under Criterion A2 as Endangered

The population reduction over the past 30 to 60 years is suspected to be 50%, based on (c) above.

Past reduction is based on historic losses of wetlands, river regulation, and major droughts in the last 3-4 decades.

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 30 to 60 years is projected to be 70%, based on (c) above.

Future reduction is based on the projected impacts of the suite of threats identified, particularly climate change, aquatic weed invasion, and feral animal impacts.

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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 132 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 based on the massive historic losses of wetlands by draining and agricultural impacts, and the current threats. While the taxon is capable of very wide dispersal by waterfowl (and to a much less significant dispersal by water), once lost, a subpopulation would have very limited capacity for recolonisation, partly because source populations of propagules are very few and highly dispersed.

It is inferred to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the impacts of the identified threats.

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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

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

Aston H.I. (1973). *Aquatic Plants of Australia*. Carlton: Melbourne University Press.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

Sainty, G.R., and Jacobs, S.W.L. (1981). *Waterplants of New South Wales*. NSW, Water Resources Commission.



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VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Nymphoides geminata*. Retrieved from <https://vicflora.rbg.vic.gov.au/flora/taxon/6ba789b0-8635-4580-a873-112ecccc52ab>