Threatened Species Assessment

Althenia marina
Sea Water-mat

Taxonomy

Althenia marina (E.L. Robertson) Yu Ito

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Lepilaena marina* E.L. Robertson (SAC 2004).

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

Proposed conservation status

Critically Endangered in Victoria

Criterion A3ce

Species Information

Description and Life History

Plants dioecious. Leaves not tapering distally; auricles 2–2.5 mm long; leaf margin entire; apex usually truncate with a central mucro. Female flowers with pedicel 1–2(–5)mm long; stigmas obliquely funnel-shaped, c. 0.3–0.5 mm wide, margin irregular. Male flowers with scales 3-lobed; anther mass 6-locular; at anthesis the pedicels elongate to 10–15 mm long and extend beyond leaf-sheath. Fruit smooth with a slight ridge dorsally, (1–)1.3–1.7(–2) mm long (excluding style); fruiting pedicel not or only slightly extended, 1–1.5 mm long, so fruit not or only slightly extended beyond the leaf-sheath. The taxon flowers mostly from Jul.–Dec. (VicFlora 2018).

The taxon is annual or short-lived perennial, dioceious submergent herb. It is an obligate outcrosser (i.e. plants single sex) and it is presumably pollinated under water or on the water's surface like other *Althenia*. Fruits/seeds are presumably dispersed by water and/or birds, particularly the Black Swan.

Generation Length

The generation length of *Althenia marina* is suspected to be 1 to 10 years. The longevity of the taxon is not known and several authors suspect that it is probably an annual. If it not an annual then it is most likely short-lived, that is, less than five years. Hence, the population would turn over in ten years.

Distribution

The taxon is recorded from western Port Phillip Bay, the Spit Lagoon north of Point Wilson, Point Wilson and Swan Bay, as well as Jack Smith Lake and Lake Reeve, Gippsland. There are pre-1970 records from southern Port Phillip (e.g. Point Nepean) and a brackish lake 45 kilometres SSE of Ararat. The taxon also occurs in WA, SA, and Tasmania. It is endemic in southern Australia.

Habitat

The taxon occurs in mid eulittoral shallow tidal marine environments and saline/brackish lakes in water to c. 45cm deep. The substrates are muddy, sandy and shelly. It occurs as a component of dense sea-grass and algal communities dominated by other sea-grasses (*Zostera*, *Heterozostera*, *Ruppia* spp.) and diverse algae. It also occurs in coastal or inland lakes associated with other *Althenia* spp. and *Ruppia* spp.

Threats

The threats to the taxon include pollution, especially oil spills; severe wave action caused by storm events and increased storm surge; mechanical damage caused by boating activities; elevated nutrient levels leading to enhanced algal growth (i.e. algal blooms); competition from algae and other marine angiosperms (i.e. seagrasses); grazing by Black Swans; elevated temperatures (insolation) at low tides; and changing temperatures under climate change, which can potentially scorch the plants. Sea level rises pose a major threat to most subpopulations as they cannot migrate landward, due to an inability to maintain preferred water depths because of infrastructure and coastal geomorphology. The acidification of ocean waters under climate change is also a threat.

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 A3 as Critically Endangered

The population reduction over the next 3 to 30 years is projected to be 50 to 80%, based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats. Notably, sea level rise is the major threat as it will reduce habitat availability significantly, and is projected to rise by 80-100 cm by end of the century. The tidal eulittoral zone will be unable to migrate landward in most locations where the taxon is now found. Landward migration of the eulittoral habitat of the taxon is not considered possible in most of Port Phillip bay, thus decline is likely to be continual. Habitat for the taxon is only available on low-energy coasts, which excludes the great majority of the Victorian coastline.

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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 2,500 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 36 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

Any two of (a), (b) or (c) above are also satisfied.

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

It is suspected that there are 100,000 to 500,000 mature individuals, which exceeds the thresholds for criterion C.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 50	< 250	D1 < 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

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