

Enneapogon gracilis Slender Bottle-washers

Taxonomy

Enneapogon gracilis (R. Br.) P. Beauv.

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criterion D2

Species Information

Description and Life History

The taxon is a tufted or stoloniferous perennial, scarcely woolly at base, culms simple or branched, virtually glabrous, erect, to 45 cm high, nodes glabrous. Leaves smooth and glabrous or very sparsely hairy with simple and/or glandular hairs; blade inrolled, to 12 cm long and 2.5 mm wide; ligule c. 0.2 mm long. Inflorescence a moderately dense, ovoid to oblong, spike-like panicle 1-6 cm long and 0.5-1.2 cm wide, green to grey-green. Spikelet 2-4-flowered, usually only the lowest fertile; glumes 5-9-nerved, glabrous or with scattered hairs, ovate, 3-6 mm long, sub-equal; body of lower lemma hairy in lower part, thickened and shining, 1.5-2.3 mm long; awns 2-3.5 mm long, the outermost 2-nerved at base (or the outermost nerve giving rise to an extra, shorter awn); palea of lower floret shortly exceeding body of lemma, hairy. Flowers August to March (VicFlora 2017).

Generation Length

The generation length of *Enneapogon gracilis* is estimated to be 5 to 35 years (midpoint 15 years), based on the likelihood that the taxon recruits opportunistically in response to exceptional rainfall events and localised site disturbance. There is no evidence to indicate whether the taxon has any dependence on fire for recruitment. Pre-settlement fire events in the rainshadow landscape of the Upper Snowy district are likely to have been exceeding rare, given the fire-sensitivity and age class of *Callitris columellaris* with which it is associated. The upper bound reflects the observation that the taxon is stoloniferous, suggesting that it may survive both fire and intense grazing by vegetative proliferation as well as by seed recruitment.

Distribution

The taxon is confined in Victoria to the upper reaches of the Snowy River and its tributaries (e.g., Willis at the New South Wales border, Suggan Buggan, near Mackillops Bridge between Tubbut and Wulgulmerang), with an isolated record near Patho in northern Victoria. It also occurs in Queensland and New South Wales (VicFlora 2017).

In 2010 Neville Walsh collected the taxon in the Patho Cemetery in the Victorian Riverina near Gunbower. This record is highly disjunct from all other Victorian and interstate specimen records raising the possibility that it may be adventive to the site. The closest record is a 2002 collection from the Sturt Highway east of Balranald in the NSW Riverina.

Enneapogon gracilis Slender Bottle-washers

Habitat

The taxon is typically associated with *Eucalyptus albens* (White Box), *Callitris glaucophylla* (White Cypress-pine), *Dichondra repens* (Kidney-weed), *Dodonaea viscosa* subsp. *angustissima* (Slender Hop-bush), *Kunzea peduncularis* x *phylicoides* (River Burgan), *Poa sieberiana* var. *sieberiana* (Grey Tussock-grass), *Rytidosperma racemosum* var. *racemosum* (Slender Wallaby-grass) and *Themeda triandra* (Kangaroo Grass). Substrates include brown sandy loam in Riparian or Rainshadow woodlands.

At the Patho Cemetery, the taxon occurs in remnant grassland east of the existing graves where locally common in coarse sandy/gravelly soil in association with *Callitris glaucophylla* (White Cypress-pine), *Allocasuarina luehmannii* (Buloke), *Dysphania pumilio* (Clammy Goosefoot) and *Austrostipa* species (Spear Grass).

Threats

The threats to this taxon are intense grazing and trampling by macropods, rabbits, feral horses and Sambar Deer, particularly during periods of drought, as well as adult mortality and recruitment failure in response to extreme drought stress. Most *Enneapogon* taxa are regarded as highly palatable and valued by pastoralists as fodder for stock, suggesting the taxon is likely to be highly susceptible to intense grazing pressure, particularly during periods of drought. Competition from invasive exotic species may also potentially threaten recruiting stands.

All *Enneapogon* taxa are C4 grasses, responding well to summer rain. This implies that the projected increase in summer rain at the expense of reliable winter rain in response to climate change may favour the taxon at the expense of other C3 grasses.

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>	<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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.

Enneapogon gracilis Slender Bottle-washers

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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range, based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA), is estimated to be 33,423 km² which exceeds the threshold for criterion B.

The Area of Occupancy (AoO) across the taxon's range, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA, is estimated to be 36 km² but other thresholds under this criterion have not been met.

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 Victoria.

Enneapogon gracilis Slender Bottle-washers

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 km ² or number of locations ≤ 5

Evidence:

Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted. It is estimated to have 1 to 2 locations, and is subject to threats, primarily grazing and trampling by native and exotic herbivores and extreme drought stress, which could drive it to become Critically Endangered or Extinct within a timeframe of one or two generations.

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 (2017). Flora of Victoria, Royal Botanic Gardens. *Enneapogon gracilis*. Retrieved from:
<https://vicflora.rbg.vic.gov.au/flora/taxon/7ea86ce2-5d1b-4363-94ff-b7c1cd5b313b>