Threatened Species Assessment

Wurmbea biglandulosa subsp. *biglandulosa*
Glandular Early Nancy

Taxonomy

Wurmbea biglandulosa subsp. *biglandulosa* (R. Br.) T.D. Macfarl.

One of two subspecies, the other subspecies (subsp. *flindersica*) is endemic in South Australia (Flinders ranges).

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 B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

Wurmbea biglandulosa subsp. *biglandulosa* is a perennial, summer-dormant, cormous geophyte to 30 cm high, with an annually renewed corm (the 'mother' corm assumed to die, and the 'daughter' corm enters dormancy, to renew growth next autumn). Reproduction by seed only; recruitment continuous, from a soil-stored seedbank of unknown longevity; fire stimulates a pulse of germination and plants are post-fire reprouters and fire stimulates flowering. Plants are mostly hermaphrodite with bisexual flowers only, or lower flowers are bisexual and upper flowers male, occasionally all flowers male; there are 1-6 flowers in the inflorescence. The breeding system is thus inbreeding or outbreeding, and flowers are self-fertile (as in *W. dioica*). Pollination is by insects (flies, hover-flies, and perhaps bees and butterflies) and seeds are dispersed by the censer mechanism, i.e. by wind, animal interference etc. from the upward pointing capsules. Dispersal distance likely to be only a few metres, and combined with pollination movement distances, gene-flow likely to be not more than a few tens of metres.

Generation Length

The generation length of *W. b.* subsp. *biglandulosa* is suspected to be 15 to 30 years, based on the taxon's longevity and continuous recruitment.

Distribution

The taxon is widespread in north-east Victoria, with a few collections in East Gippsland and one in the Castlemaine area, and a few in the Melbourne region.

Habitat

The taxon occurs in open forest and woodland at moderate elevations to almost 800 m above sea level on a variety of well-drained but often seasonally moist soils. Many records are from shallow-soil moss beds over granitic geology.

Threats

Threats to the taxon include; climate change (reduced rainfall, increased evaporation, extreme temperatures); increased intensity of fire; soil loss on bare post-fire substrates; damage to plants and soils by rabbits; inappropriate timing of prescribed fire (winter-spring); and weed invasion.

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 Vulnerable

The population reduction over the past 45 to 90 years is suspected to be 30%, based on (c) and (e) above.

Past reduction of the taxon's population is based on historic land clearance for agriculture and softwood plantations, and from weed invasions and stock grazing.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 45 to 90 years is suspected to be 30 %, based on (c) and (e) above.

Future reduction of the taxon's population is based on the projected impacts of the suite of threats identified, particularly climate change and weed invasion.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 45 to 90 year period, including both past and future, is suspected to be 30 %, based on (c) and (e) above.

Future reduction of the taxon's population is based on the projected impacts of the suite of threats identified, particularly climate change and weed invasion.

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 Area of Occupancy (AoO) is estimated to be 92 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 taxon's limited dispersal ability, the barriers to dispersal and/or the lack of habitat separating them. Such fragmentation precludes the possibility of recolonisation in the event of local extinction.

It is infered to have one locatins, and has a continuing declline in (i), (ii), (iii), (iv) and (v) above, due to the identified threats, particularly climate change and weed invasion.

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	< 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

Bates, R.J. (1995). The species of Wurmbea (Liliaceae) in South Australia. *Journal of the Adelaide Botanic Gardens. 16:* 33-53

Carr, G.W. (2018). *Pheasant Creek Flora Reserve - Vegetation, flora, significance and management issues*. Unpublished report prepared for Koetong Landcare Group. Fairfield, Ecology Australia.

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

McFarlane, T.D. (1980). A revision of Wurmbea. *Brunonia 3*(2): 145-208

VicFlora (2014). Flora of Victoria, Royal Botanic Gardens Victoria: *Wurmbea biglandulosa* subsp. *biglandulosa* . Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/f0ec6084-ad97-4e73-8602-8d877bc5d15c