



Almaleea paludosa Marsh Bush-pea

Taxonomy

Almaleea paludosa (Joy Thomps.) Crisp & P.H. Weston

The taxon was previously known as *Pultenaea paludosa*.

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 B1ab(iii)+2ab(iii)

Species Information

Description and Life History

The slender, trailing shrub, branches to 1 m long; stems densely pubescent when young. Leaves narrowly ovate to elliptic, 6-8 mm long, 1-2 mm wide; apex acute; both surfaces glabrous, the lower with a dark purplish-brown central band; margin flat, scabrous, sparsely ciliate when young; stipules linear, c. 5 mm long, tips with several fine hairs c. 1 mm long. Inflorescence a dense head of c. 6-12 flowers; bracts 1.5-3 mm long, outer ones broadly ovate, hairy except at tip, inner ones narrowly lanceolate, densely hairy; calyx 3-4 mm long, hairy; bracteoles attached to pedicel immediately below calyx tube, linear, c. 2 mm long, densely hairy; standard c. 4 mm wide; ovary and base of style densely hairy. The taxon flowers from September to October (VicFlora 2019).

Generation Length

The generation length of *Almaleea paludosa* is estimated to be 45 to 60 years. Generation length is based on a plausible pre-settlement fire interval of 45-60 years. It is also based on the inference that the taxon is likely to be a fire-sensitive obligate seed regenerator (OSR) which recruits episodically post-fire, with only minor opportunistic recruitment in response to localised site disturbance events, such as scouring by floodwaters. Severe fire is likely to destroy all parts of the plant, resulting in recruitment from a long-persistent soil-stored seedbank. The longevity is likely to be in the range of 35-50 years.

Distribution

The taxon is confined in Victoria to East Gippsland, between Cabbage Tree Creek and Cann River, and is rather rare (VicFlora 2019).

Site and specimen records in the Australian Virtual Herbarium (AVH) and the Victorian Biodiversity Atlas (VBA) indicate that the taxon extends from the Cape Conran area in the west to the Wingan Inlet area in the east, and from the coast inland to the Princes Highway between Cabbage Tree Creek and the Bemm River crossing.

Habitat

The taxon is confined to densely vegetated lowland swamps (VicFlora 2019).

Threats

The taxon is threatened across its very restricted Victorian range by the increasing risk of repeat fire events at intervals below the tolerable fire interval (TFI) for the taxon, which is likely to be in the 5-10 year range. Fires approaching or below this interval are increasingly likely in response to climatic drying and warming, and the increasing frequency, intensity and landscape scale of fuel reduction burns throughout the region. Repeat fire events at intervals below the TFI increase the risk of seedbank depletion, exhaustion and local extinction.

Climatic drying and the increasing frequency, intensity and duration of extreme drought events also increase the risk of recruitment failure following high intensity fire events, resulting in seedbank depletion, exhaustion and eventual local extinction.

The taxon is now also threatened by Sambar Deer, which are undergoing a population explosion across the very restricted Victorian range of the taxon. Sambar threaten the taxon by trampling and wallowing in the wetland habitat of the taxon and potentially also by targeted browsing, particularly of recruiting stands following fire, as has been observed for a related threatened plant, *Pultenaea weindorferi*, in similar wetland habitats.

The taxon is a habitat specialist highly dependent on hydrological stability of its wetland habitat. The taxon is therefore increasingly threatened by climatic drying, a threat now well established at all sites, which is projected to result in local contraction of the available swamp habitat.

The taxon is also potentially at risk from *Phytophthora cinnamomi*, which is known to be lethal to some allied taxa (e.g. some *Pultenaea* species) in habitats conducive to local pathogen spread. This is particularly the case on seasonally waterlogged duplex profiles such as those associated with *Eucalyptus consideniiana*, which is an associate in a least one quadrat site.

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:

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.

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 B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 934 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the subregional and landscape scales, based on a very poor dispersibility and restriction to naturally fragmented habitats isolated within separated catchments. Most stands are isolated at spacings greatly exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. This precludes the possibility of recolonisation in the event of local extinction.

The number of locations is based on the identified threats which operate consistently across the ecologically and geographically restricted Victorian range of the taxon.

It has a continuing decline in (iii) above, based on the current and projected impact of the identified threats. Key threats include repeat fire events at intervals below the TFI for the taxon, climatic drying and warming, planned burning, extreme drought events, and impacts of Sambar and *Phytophthora cinnamomi*.

The taxon is severely fragmented

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 40 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is estimated to be severely fragmented has 1 location and has a continuing decline in (iii) above.

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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

There is no available estimate of population size for the taxon.

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.

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 (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Almaleea paludosa*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/8bc361b8-a4c4-4544-bbd6-c078b7651a07>