

Threatened Species Assessment

Allocasuarina luehmannii Buloke

Taxonomy

Allocasuarina luehmannii (R.T. Baker) L.A.S. Johnson

Synonyms: *Casuarina luehmannii* R.T. Baker

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1991).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2abce+3bce+4abce

Species Information

Description and Life History

The taxon is dioecious tree, 5 -15 m tall; penultimate branchlets woody. Bark furrowed. Branchlets ascending, to 40 cm long; internodes 8- 22 mm long, 1 - 2 mm diam., often waxy, finely pubescent especially in furrows when immature; ribs flat to slightly rounded, minutely roughened. Teeth 10 - 14, erect, tightly appressed, 0.5 - 1 mm long, slightly overlapping, usually withered. Male spikes 1 - 5 mm long, 5 - 8 whorls per cm; anther c. 1 mm long; bracteoles deciduous individually. Cones very shortly cylindrical, broader than long, pubescent at least when young, sessile or on peduncle to 5 mm long; cone body 5 - 12 mm long, 8 - 14 mm diam.; bracts inconspicuous; valves in 2 or 3 wheel-like rows, extending well beyond cone body, acute to obtuse, protuberance pyramidal or flattened, obtuse, entire, much shorter than bracteole body and diverging from it near base. Winged seeds 4 - 5 mm long, red-brown. The taxon flowers from Sep. - Nov. (VicFlora no date).

The fruits are spikey, oval-shaped woody cones. Pollination is by wind, and male and female flowers are found on separate plants. Recruitment of seedlings of this taxon is rarely observed in remnant populations. Post-settlement seedling recruitment has been largely restricted to higher rainfall end of range of the taxon, but observations of recruitment are rare, and the majority of "regeneration" events appear to be suckering of mature individuals rather than regeneration from seed. Pre-settlement seedling recruitment was likely driven by open gaps created by the frequent application of fire by Traditional Owners with fire intervals of 2-5 years determined by seasonal conditions.

Generation Length

The generation length of *Allocasuarina luehmannii* is suspected to be 100 to 500 years. This is based in the belief that the genets produce ramets through root suckering. Most extant specimens are likely to be at least 100 to potentially 500 years old, based on ring counts.

Distribution

The taxon occurs across northern and north-western Victoria, with southern outliers to the west of Melbourne (VicFlora no date).

Habitat

The taxon usually grows in woodland with *Eucalyptus microcarpa*, on non-calcareous soils. It is a dominant or co-dominant taxon in Buloke Woodlands (Cheal et al. 2011).

Threats

Historically, the taxon has been reduced by land clearing and stock grazing. The taxon is a nitrogen fixing plant and occurs on fertile, nutrient-rich soils that are favoured for agriculture, and only on the margin of uncleared land. The taxon is threatened by ongoing land clearing, and grazing of young plants by stock, rabbits and kangaroos, leading to recruitment failure. Where the taxon occurs in linear reserves, recruitment can be seen, but this may more as a result of suckering rather than seedling recruitment.

The regeneration of the taxon has been lacking for many decades (Cheal et al. 2011) and a study of Buloke on roadsides and in paddocks in the Moolort Plains in Victoria found a 15% decrease in the number of individual trees during the period 1993 to 2000 (Cheers 2000). Severe wildfires have killed the trees and there has been no recovery of the taxon in Wyperfeld National Park following wildfires in 1981 (Cheal et al. 2011). Other threats include increasing soil salinity and reduction in autumn rainfall as a result of climate change (Cheal et al. 2011).

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 Critically Endangered

The population reduction over the past 300 to 1500 years is inferred to be 50 to 90%, based on (a), (c) and (e) above.

Past decline is based on estimates of habitat loss through agricultural clearance, as well as tree counts. If the population is made of cloned individuals, the population decline may be less than previously estimated. However,

there has been a demonstrable decline which is much greater than 50% and may be up to 90%, depending on the genetic makeup of the populations.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is projected to be 50 to 90%, based on (b), (c) and (e) above.

Future decline is based on the continuing loss of remnant veteran trees on private land, including isolated paddock trees, which are either distinct individuals or the last remnants of a self-replicating individual. This is due to intensification of cropping activity coupled with age and the ongoing impact of climatic drying. At the current rate of loss on private land, where 97-98% of the community remains, a 100% loss in 10 years could be predicted.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 300 to 1500 year period, up to a maximum of 100 years into the future, is projected to be 50 to 90%, based on (a), (b), (c) and (e) above.

This is based on the projected past and future declines.

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 is estimated to be 134,606 km² and the Area of Occupancy (AoO) is estimated to be 5,777 km², both of which exceed the thresholds for criterion B.

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 10,000,000 mature individuals, which exceeds the thresholds for criterion C.

The estimation of population size for this taxon is difficult, if not impossible, given the high level of suckering of mature individuals. Differentiation between genet and ramets is problematic and it may be that extant populations of mature individuals are composed of a small number of individuals.

Some experts argue that most mature trees, at least in the Wimmera, represent distinct genets, whilst other experts suggest many extant individuals may belong to single very old and widely distributed genets. Although given the number of populations of the taxon, it is still likely to be substantial.

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:

Ineligible under Criterion D

The taxon is suspected to have 100,000 to 10,000,000 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

- Cheal, D., Lucas, A., & Macaulay, L. (2011). *National Recovery Plan for Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions*. Department of Sustainability and Environment, Melbourne.
- Cheers, G. (2000). An Assessment of Bulokes and Sheoaks on the Moolort Plains July 2000. Moolort Landcare Group.
- DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.
- SAC (1991). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 15 *Allocasuarina luehmannii*.
- VicFlora (no date). Flora of Victoria, Royal Botanic Gardens Victoria: *Allocasuarina luehmannii*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/cd00e21f-6b74-46ea-8258-ed2dd9f0055b>