Threatened Species Assessment

Eucalyptus yarriambiack
Yarriambiack Mallee-box

Taxonomy

Eucalyptus yarriambiack Rule

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*.

Proposed conservation status

Critically Endangered in Australia

Criteria A2ce+3ce+4ce; B1ab(i,ii,iii,iv,v); C1

Species Information

Description and Life History

The taxon is a small spreading tree with a few thick trunks and light grey-brown, box-type bark persisting to the upper trunk with smooth light grey brown bark above. It grows to 10m high and 10m wide. Adult leaves are lanceolate or narrowly lanceolate olive-green and 5-10cm long. Inflorescences are simple, axillary and 7-11 flowered along main axis or on terminal leafy branchlets. The buds are 4-6mm long and lightly pruinose at antithesis, and flower filaments are white. Flowering occurs in autumn (SAC 2016). Seedling recruitment is minimal and seedlings are absent along the stretch of the Henty Highway where several of the mature trees occur (Rule 2012).

The taxon is included in a group of 'Mallee-boxes' by Rule (2012), which includes the Victorian taxa *Eucalyptus polybractea, E. viridis, E. wimmerensis, E. walshii, E. filiformis* and *E. hawkeri* , but it is generally distinguished from these by its persistent rough bark that extends to the upper stem, and its relatively robust, few-stemmed habit (VicFlora 2018).

Recruitment events are rare. It is likely that the taxon may require a disturbance event such as fire to set viable seed and open up space in the understory and canopy for succession, although this had not been tested and is based around requirements for other *Eucalyptus* taxa.

Generation Length

The generation length of *Eucalyptus yarriambiack* is inferred to be 150 to 400 years. This is based on a likely longevity of 150-400 years, inferred from the taxon's typically multi-stemmed habit and lignotuberous resprouting capacity. It is also inferred from a likely episodic recruitment post-fire, continuous recruitment in good seasons (and potentially after flood events), and a plausible pre-settlement fire-interval of 25-75 years.

Distribution

The taxon is endemic to Victoria. The population is entirely restricted to roadside areas between Brim and Beulah in the southern part of the Victorian Mallee region, along the Henty Highway and adjacent roadsides. Similarly vegetated roadsides in the area were surveyed in May 2015 for *E. yarriambiack,* but no further populations were found. No information is available regarding the historic distribution of the taxon, however it is likely to have been present on the adjoining (now cleared) cropping paddocks (SAC 2016).

Habitat

The taxon occurs on well-drained mallee loams near seasonal watercourses, specifically, it occurs close to the Yarriambiack Creek which, due to low rainfall of the area, is usually dry.

Growing in remnant Riverine Chenopod Woodland, the taxon prefers marginally better drained sites than the more common and widespread *E. largiflorens*. *E. yarriambiack* occurs in pure stands but has contact with *E. dumosa* and *E. largiflorens* on the boundaries of its distribution (Rule 2012; SAC 2016; VicFlora 2018).

Threats

There is evidence of limited recruitment in the population, suggesting barriers to recruitment and/or rare germination events. The few younger plants in the population have been estimated at about 10-20 years old, with the remainder being mature trees. The narrow roadside and easement habitat may restrict available germination space, as could the construction of roadside firebreaks by private land managers in the area (SAC 2016). Due to the small population size, most of the threats affecting the taxon could potentially result in the extinction of the taxon. In particular, stochastic events and the lack of recruitment may be the most imminent threats.

Stochastic events such as fire or vehicle related incidents could be enormously detrimental to the taxon, as the population numbers are low and limited in distribution (SAC 2016). The lack of available habitat also presents a significant barrier to population growth. The roadside habitat on which *E. yarriambiack* grows has poor quality vegetation structure and numerous invasive weed taxa. This may reduce the functionality of the ecosystem, restricting services vital to plant health such as pollinator availability and soil microbial interactions (SAC 2016).

Given the location on a highway road side it is not unlikely that there will be future works associated with provision of services such as power, communications, road maintenance, or upgrades, and works associated with fence line repair could potentially impact some plants. Ploughed fire breaks along roadsides to protect cropped land and fences are common in this area, and exist in areas of *E. yarriambiack* distribution (SAC 2016).

The *E. yarriambiack* population consists of adult trees with some younger plants, likely between 10 and 20 years old (P. Rudolph pers. comm.). There may be a lack of suitable rainfall and follow up rainfall in recent drought years to enable seedlings and young trees to grow (L. Macaulay pers. comm.), especially as the seedling trials conducted by Kevin Rule demonstrated that trees are highly fertile (K. Rule pers.comm.). Additionally, the limited recruitment may be due to the limited room for growth on the roadsides (SAC 2016).

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 Critically Endangered

The population reduction over the past 450 to 1,200 years is estimated to be 70 to 95% (midpoint 80%), based on (c) and (e) above.

Past decline is based on the inferred habitat loss throughout the region to agriculture.

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 95% (midpoint 80%), based on (c) and (e) above.

Future decline is based on the identified threats, including recruitment failure, browsing pressure, extreme drought stress, the reducing reliability of flood events, weed invasion, and roadside management activities including fire break construction.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 450 to 1,200 year period, including both past and future (up to 100 years in the future), is estimated to be 90 to 98%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 16 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas. The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale. Each subpopulation comprises of remnant stands in a degraded landscape, with no capacity for recolonisation in the likely event of the local extinction of subpopulations.

It is estimated to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the impacts of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 16 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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:

Eligible under Criterion C as Critically Endangered

It is estimated that there are 120 to 150 mature individuals.

There is estimated to be a continuing decline of 50 to 95% (midpoint 80%) within one generation, based on the identified threats.

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 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 120 to 150 mature individuals.

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

References

Rule, K.J. (2012). Five new endemic eucalypts for Victoria. *Muelleria, 3*(2): 83-105.

SAC (2016). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 865 *Eucalyptus yarriambiack*.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Eucalyptus yarriambiack*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0eb50c0d-bf66-4dfb-9cca-3615859ad63c