Threatened Species Assessment

Eucalyptus ornans
Avon Peppermint

Taxonomy

Eucalyptus ornans Rule & Molyneux

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2016).

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

Proposed conservation status

Critically Endangered in Australia

Criteria A2a+4ac; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C1+2a(i,ii); D

Species Information

Description and Life History

The taxon is a small, slender mallee, 4-10 m tall. It exhibits erect stems and has semi-pendulous branchlets. Its bark is smooth and whitish when new while old bark is light grey and decorticates in short strips and ribbons. Loose bark often accumulates about the base of trees (SAC 2016). The taxon flowers in summer. In the nursery trade, *Eucalyptus ornans* is known as 'Eucalyptus Dry White' (SAC 2016). The taxon is an extremely rare mallee form of peppermint of the series Radiatae (Rule and Molyneux 2011).

Eucalyptus ornans is a new taxon. It is highly restricted, lignotuberous mallee interpreted as a relictual taxon which evolved in extremely cold conditions in the late Quaternary permafrost period and survived competition from migrating forest species as the climate of south-eastern Australia became warmer in the Holocene (Rule and Molyneux 2011; SAC 2016).

Generation Length

The generation length of *E. ornans* is inferred to be 75 to 250 (midpoint 150) years. The generation length is based on the lignotuberous mallee habit which extends the life of the taxon beyond disturbance events such as fire or flood, which are likely to occur at intervals of 15-90 years. The lack of young trees indicates that recruitment is not occurring (SAC 2016) and that recruitment is likely to be episodic in response to fire or flood.

Distribution

The taxon occurs in relatively remote and inaccessible areas of eastern Victoria, specifically in the Avon Channels to the north of Maffra in the Central Gippsland region of Victoria (Rule and Molyneux 2011).

The taxon occurs as a single known population approximately 30 km to the north of Maffra on the banks of the Avon River (in the Avon-Mount Hedrick Natural Features Scenic Reserve) in the Central Gippsland region of Victoria (Rule and Molyneux 2011; SAC 2016). The river at this location is sometimes known as the Avon Gorge.

Habitat

The taxon grows in coarse gravels around a narrow, lake-like outlet of the Avon Channels (Rule and Molyneux 2011). It grows in association with *Eucalyptus bridgesiana, E. cephalocarpa, E. consideniana, E. cypellocarpa* and *E. globoidea at* its margins on higher, drier sites. Other species, including *E. goniocalyx* subsp. *goniocalyx, E.*

macrorhyncha, E. melliodora, E. polyanthemos subsp. *vestita, E. muelleriana, E. sieberi* and *E. tricarpa* subsp. *tricarpa*, occur in the immediate vicinity (Rule and Molyneux 2011).

Threats

The small population is entirely restricted to a small area on the banks of the Avon River. The lack of young trees indicate that recruitment is not occurring (SAC 2016). In 2007 there were severe floods that appear to remove all but 10 individuals were washed away (SAC 2016). However anecdotal observations in early 2021 (Larke & Henderson pers. comm.) noted a continuous population of approximately 400-500 trees (predominately 10–15-year-old re-growth from lignotuberous mallees. No new recruits were observed.

There is an ongoing risk of flooding and loss of trees which could result in further population reduction and the extinction of the taxon long-term (SAC 2016), although as been noted, the trees appear to recover. The small size of the population still suggests that the taxon is at high risk from stochastic events. In the longer term, the taxon may be impacted by climate change-induced drying and warming and reduction of stream flows. Climate change might also lead to extreme weather events, such as droughts and severe floods.

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 A3 as Vulnerable

The population reduction over the next 100 years is suspected to be 20 to 40%, based on (a) and (c) above.

The single small population is entirely restricted to a small area on the banks of the Avon River and the lack of young trees indicates that recruitment is not occurring. Furthermore, there is an ongoing risk of flooding and loss of trees, which could result in further population reduction and the extinction of the taxon. However trees seems to be able to recover from flood damage.

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 4 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.

It is estimated to have 1 location, as a severe flood could rapidly affect all individuals present. It has a continuing decline in (iii) and (v) above.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 1 location and has a continuing decline in (iii) 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 C2 as Endangered

It is estimated that there are 400 to 500 mature individuals. The taxon was thought to occur as a single known population of 10 individuals, approximately 30 km to the north of Maffra on the banks of the Avon River in the Central Gippsland region (Rule & Molyneux 2011). However R. Leake (Cranbourne Botanic Gardens) noted in early 2021 that 750m further down the river there was a continuous population of approximately 400-500 trees (predominately 10-15-year-old re-growth from lignotuberous mallees) on the western side of the bank, but only 10 individuals on the eastern side.

There is an estimated continuing decline, and the number of mature individuals in one subpopulation is 100%.

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 Vulnerable

The taxon is estimated to have 400 to 500 mature individuals.

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

References

Larke R. and Henderson M. pers. comm, (2021) Royal Botanic Gardens Cranbourne, 23/ February 2021.

Rule, K., and Molyneux, W.M. (2011). Two new mallee Eucalypts (Myrtaceae) from Gippsland, Victoria. *Muelleria, 29*(1), 16-26.

SAC (2016). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 873 *Eucalyptus ornans*

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens: *Eucalyptus ornans.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/d0c7e2bd-92f5-46b9-92cc-58a7c5aca13f

.