

Eucalyptus denticulata Errinundra Shining Gum

Taxonomy

Eucalyptus denticulata I.O. Cook & Ladiges

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

The taxon is a tall tree similar to *Eucalyptus nitens*, differing most conspicuously in the shorter juvenile phase of the saplings, the denticulate margins of the adult leaves and the persistent outer operculum with the scarred tip showing emergent inner operculum. Flowering time unknown. *Eucalyptus denticulata* and *E. nitens* are closely related and morphological divergence between them is only partial in many populations in the eastern highlands (VicFlora, 2019).

Generation Length

The generation length of *Eucalyptus denticulata* is inferred to be 100 to 250 years. This taxon presumably has a potential life span of up to several hundred years or more. It is readily killed by fire, with regeneration largely restricted to following fire. Trees are considered likely to reach reproductive maturity within twenty years. On this basis an average generation length of 100-250 years is proposed based on likely fire-frequencies in the Montane Wet Forest habitat.

Distribution

The taxon occurs mainly in East Gippsland, such as on the Errinundra Plateau and in the Mt Kaye and Mt Tennyson areas. Other populations have been recorded near Erica, Tanjil Bren and Marysville in the Central Highlands.

Habitat

The taxon occurs in wet forests in high rainfall areas at montane elevations.

Threats

Errinundra Shining Gum may have declined to some degree as a result of historic forestry operations and, more recently, from bushfires. The Central Highlands populations are currently threatened by increased fire frequency and intensity, hybridisation and competition with *Eucalyptus nitens*. Isolated East Gippsland populations at Concordia Gully and near Murrungower are at significant risk of local extinction due to competition.

The unique adaptation to higher frost incidents exemplified by slower growth rates and retention of juvenile foliage (compared with *E. nitens*) renders this taxon potentially at competitive risk as temperature thresholds change.

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There is also erratic and often poor seed production and genetic introgression through hybridisation with planted *E. nitens*, at least on Errinundra Plateau.

Spatial analysis of likely habitat for Errinundra Shining Gum on all land tenures indicates that 70% occurs within the Comprehensive, Adequate and Representative (CAR) reserve system, including parks and reserves, special protection zones and areas excluded from harvesting by prescription under the Victorian Code of Practice for Timber Production 2014 (the Code). In recent years, modified harvesting and forest regeneration practices have been implemented in native forest that are designed to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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 style="text-align: center;"><i>based on any of the following:</i></p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>			

Evidence:

Eligible under Criterion A2 as Vulnerable

The population reduction over the past 300 to 750 years is inferred to be 20 to 40% (midpoint 30%), based on (c) and (e) above.

There has been a decline as a result of the past and current threats, and this has been exacerbated by the 2019-20 bushfires where trees are likely to have been killed, especially in areas of high fire severity.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is suspected to be 30 to 70% (midpoint 50%), based on (c) and (e) above.

This decline is likely to occur due to the combination of climate change, associated droughts, altered fire regimes and competition with other eucalypts, especially as conditions change.

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Eligible under Criterion A4 as Vulnerable

The population reduction over any 300 to 750 year period, including both past and future (up to 100 years in the future), is inferred to be 30 to 50% (midpoint 40%), 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 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 Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 12,256 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is inferred to have two locations. The taxon occurs in two main areas, one being in East Gippsland, the other in the Central Highlands. Climate change acts synchronously on the entire range, or alternatively if fire events are seen as trigger for climate change impact, only two discrete fire events will be able to affect the bulk of the population.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the impacts of the identified threats, notably increased fire frequency and reduced reliability of rainfall.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 496 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is inferred to have 2 locations and has a continuing decline in (i), (ii), (iii), (iv) and (v) 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

It is suspected that there are 200,000 to 500,000 mature individuals, which exceeds the thresholds for criterion C.

There are around 330 database records of the taxon, but no relevant population counts are available. Some coarse assumptions based on number of records, average cover in quadrats, extent of habitat and tree density within habitat allow a guess at an estimated population of between 200,000 and 500,000 trees in East Gippsland, however these numbers may be highly doubtful. The Central Highlands populations are much smaller.

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

It is suspected that there are 200,000 to 500,000 mature individuals.

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



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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: *Eucalyptus denticulata*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/78d14cd2-4a08-492e-9507-be9011debe19>