

Eucalyptus litoralis Otway Grey-gum

Taxonomy

Eucalyptus litoralis Rule

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria A2abce+3bce+4abce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a tree to 18 m tall, sometimes multi-stemmed; bark rough over much of trunk, fibrous, thin, grey-brown, persistent, less often forming a short basal stocking. Juvenile leaves sessile, opposite for many pairs, broadly ovate to broadly elliptic, cordate, to 8 cm long, 6 cm wide, discolorous, glossy, green above, tips lightly pruinose; adult leaves petiolate, alternate, broadly lanceolate, 18-35 cm long, 2.5-4.5 cm wide, concolorous, glossy, green, reticulation dense, with scattered island and intersectional oil glands. Inflorescences axillary, unbranched; peduncles flattened, to 2.5 cm long, 7-flowered; buds sessile or shortly pedicellate, ovoid-cylindric, bulging near base, to c. 1.4 cm long, 0.6 cm diam., with conical to rostrate operculum, hypanthium ribbed, scar present; stamens inflexed; anthers dorsifixed, oblong; ovules in 4 vertical rows; flowers white. Fruit sessile or pedicellate, cylindric to truncate-ovoid, to 1.3 cm long, 1.1 cm diam.; disc descending; valves 3 or 4, rim level or below; seed dark brownish-black, flattened-ellipsoid, shallowly reticulate, hilum ventral (VicFlora 2018).

Generation Length

The generation length of *Eucalyptus litoralis* is inferred to be 50 to 150 years. This is based on a lignotuberous habit which facilitates repeated resprouting following severe fire events, thereby extending longevity beyond the age of each generation of stems or ramets.

Distribution

The taxon occurs along the Otway Coast of Victoria from the north-east of Anglesea, to as far as Airey's Inlet in the south-west, with an outlier occurring close to Lorne. Some populations are secure within protected reserves including the Angahook-Lorne National Park (Rule 2004).

Habitat

The taxon favours poor, shallow soils on low sandstone ridges and slopes, which are often exposed to the prevailing ocean winds. The annual rainfall of Anglesea is approximately 800 mm, most of which falls in winter (Rule 2004). *Eucalyptus obliqua*, *E. viminalis* subsp. *viminalis*, *E. aromaphloia*, *E. baxteri*, *E. tricarpa* and *E. ovata* have been observed in association with *E. litoralis*, whilst pure stands of *E. willisii* sens lat. occur nearby (Rule 2004; VicFlora 2018).

Threats

The taxon is locally abundant and occurs in coastal areas close to Melbourne, where the Anglesea and Lorne areas are popular holiday resorts. The principal threat to almost all stands of *E. littoralis* is the direct and indirect consequences of residential development, which has resulted in the severe depletion of those stands within the urban precinct of the Anglesea township, and which continues to threaten remnant stands on undeveloped land within or on the outskirts of Anglesea, Aireys Inlet, and possibly also Marengo and Lorne (Rule 2005).

Urbanisation not only threatens the taxon with physical destruction through habitat loss, but also to a decline in habitat quality through weed invasion, eutrophication, which in turn exacerbates the risk of weed invasion, and ecologically undesirable modification of the prevailing fire regime, which adversely influences the reliability of seedling recruitment. The only stands likely to remain moderately secure are those within long-established reserves such as the Angahook-Lorne State Park at the margin of the core subpopulation and, if the tenure can be secured, at Marengo (Rule 2005).

In and around the Anglesea township, the ecological community Otway Grey Gum Woodland, which is dominated by *E. littoralis*, appears to have been a major component of the original vegetation. Within this area, most mature individuals are remnant trees within the urban fabric of the Anglesea township where the opportunity for recruitment is negligible and the risk of premature mortality high (Rule 2005).

Although the vulnerability of the taxon to catastrophic decline as a result of Eucalypt Dieback associated with *Phytophthora cinnamomi* infection has not been tested, the phylogenetic affinity of the taxon with other members of the Section *Maidenaria* suggests that the risk is likely to be low, despite the presence in the Anglesea district of sclerophyllous vegetation of a type highly susceptible to the disease syndrome. Specifically, the taxon is recorded as a consistent codominant with *Xanthorrhoea australis* (Austral Grass-tree), a highly susceptible taxon, on the former O'Donohue property (now part of Angahook-Lorne State Park) on the western outskirts of Anglesea. Nevertheless, *E. littoralis* is largely confined to heavier and more fertile soils than those supporting the most susceptible vegetation types dominated by *X. australis* and other notoriously susceptible taxa (Rule 2005).

The only other catastrophic event to which to which the taxon might be subjected is a succession of intense bushfires or management burns which may exhaust the resprouting capacity of the established mature individuals, leading to an atypical incidence of adult mortality, in the absence of successful seedling recruitment. Seedling recruitment in these circumstances may result from seed bank sterilisation as well as the chronic risk of seedling predation by rabbits and other herbivores. The likelihood of this threat is difficult to assess as it results from the interaction of a number of threatening processes (Rule 2005).

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 Endangered

The population reduction over the past 150 to 450 years is inferred to be 30 to 50%, based on (a), (b), (c) and (e) above.

Past decline is based on habitat loss to urbanisation within the townships of Anglesea and Aireys Inlet, particularly following WWII. There has been minor habitat clearance for agriculture, particularly on the northern fringes of the distribution of the taxon (Rule 2005).

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

Eligible under Criterion A3 as Endangered

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

Future decline is based on the continuing impact of urbanisation, including urban infill within the townships of Anglesea and Aireys Inlet. It is also based on the projected impacts of imposed fire regimes and the increasing risk of extreme drought stress due to climatic drying and warming.

Eligible under Criterion A4 as Endangered

The population reduction over any 150 to 450 year period, including both past and future (up to 100 years in the future), is inferred to be 40 to 50%, based on (a), (b), (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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 206 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 scale, and extreme anthropogenic fragmentation at the landscape scale within the urban precincts of Anglesea and Aireys Inlet. The taxon has no specialised mechanism for long-distance dispersal and the capacity for recolonisation in the event of local extinction is clearly compromised by habitat loss or modification.

It is estimated to have 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the continuing impact of urbanisation, imposed fire regimes, the increasing risk of extreme drought stress due to climatic drying and warming, weed invasion, eutrophication, increasing risk of repeat fire events, and the potential impact of *Phytophthora cinnamomic* infection.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 60 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 3 locations, 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 C1 as Vulnerable

It is estimated that there are 1,000 to 5,000 (midpoint 3,000) mature individuals. There is projected to be a continuing decline of 30 to 50% within three generations.

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:

Eligible under criterion D 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



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