Threatened Species Assessment

Angophora floribunda
Rough-barked Apple

Taxonomy

Angophora floribunda (Sm.) Sweet

A publication by Brooker (2000) coined the name *Eucalyptus florida* for this taxon as *Eucalyptus floribunda* and *E. intermedia* had already been used for other Eucalypts. This has not yet been widely accepted.

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 B1ab(iii,v)+2ab(iii,v)

Species Information

Description and Life History

The taxon is a tree, usually 15-30 m high, often with crooked branches, crown spreading; bark grey to brown, rough, fibrous, persistent, extending to branchlets. Juvenile leaves narrowly elliptic to narrowly ovate, to 9 cm long, 2-3.5 cm wide, glabrous or sparsely pubescent toward base, base auriculate, apex acute; adult leaves narrowly elliptic to narrowly ovate, falcate, 4.5-15 cm long, 1-5 cm wide, glabrous, discolorous. Peduncle 15-30 mm long, glabrous or sparsely covered with short white hairs, rarely with a few bristles. Flower buds ovoid or globose, 3-7 per peduncle; calyx-lobes 1-1.5 mm long; petals orbicular, 2-4 mm long, 2-4 mm wide, tuberculate; stamens numerous, filaments 5-7 mm long; style to 3 mm long. Fruit ovoid to globular 7-12 mm long, 8-12 mm wide, prominently ribbed, pubescent, tuberculate. The taxon flowers from September to February (VicFlora 2018).

Generation Length

The generation length of *Angophora floribunda* is suspected to be 20 to 200 (midpoint 150) years. Individuals are long-lived, possibly more than 150 years. Regeneration is most prolific after fires and scanty between fires. The individuals are well capable of coppicing or resprouting post-fire. The taxon is resilient to drought, but it is not particularly resilient to flooding, although its habitat in Victoria does not include areas that are likely to be flooded. The taxon blooms within a decade of fires, but blooming and seed set that are sufficient to repopulate the parent population are suspected to take more than 20 years.

The lower figure refers to the first time the taxon is likely to be capable of replacing the seed bank. The midpoint figure is an approximation of the standard time between generations, and the upper limit is conceptually how long it may take before individuals (and the associated seed bank) senesce.

Distribution

In Victoria, the taxon is restricted to a small area of far East Gippsland, extending from Wingan State Forest in the west to the border with NSW. The taxon is widespread within this small area.

Habitat

The taxon's preferred habitat is on broad ridges, slopes and broad sheets of free-draining sandy soils. The taxon is not flood tolerant and does not occur on deep fertile loams. It occurs in areas with appreciable summer rainfall and moderately high summer humidity. Rainfall is well-distributed throughout the year. The taxon typically occurs mixed with other eucalypts tolerant of infertile sandy soils, such as *Eucalyptus consideniana, E. globoidea,* and *E. baxteri*.

Threats

Vegetation clearance within the restricted range of this taxon is a historical cause of decline, but this does not operate currently. The taxon is not fast-growing and may be threatened by forestry operations in the unreserved part of its range, as it is outcompeted by quicker growing trees, such as *E. globoidea* during the regrowth phase. These considerations also apply to regeneration post-fire. The impacts of climate change are unknown and have not been investigated.

Spatial analysis of likely habitat for Rough-barked Apple on all land tenures indicates that 64% occurs within the 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). There are no species-specific protections for Rough-barked Apple, however other more general forestry prescriptions may provide protection from timber harvesting. In recent years, modified harvesting and forest regeneration practices have been implemented in native forest 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%

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 Vulnerable

The population reduction over the past 60 to 600 years is suspected to be 20 to 40% (midpoint 35%), based on (c), (d) and (e) above.

Past decline is based on the extent of clearing and possible impacts from repeat fires and forestry operations.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 60 to 100 years is suspected to be 0 to 50% (midpoint 20%), based on (c) and (d) above.

Future decline is based on the uncertain impacts of future fire regimes, competitive interactions with other taxa, and the localised impacts of forest and fire management operations.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 60 to 600 year period, including both past and future (up to 100 years in the future), is suspected to be 0 to 50% (midpoint 30%), based on (b) and (c) above.

Past decline is based on the extent of clearing and possible impacts from repeat fires and forestry operations.

Future decline is based on the uncertain impacts of future fire regimes, competitive interactions with other taxa, and the localised impacts of forest and fire management operations.

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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 478 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

It is inferred to have two locations, based on the fire risks.

It has a continuing decline in (iii) and (v) above, based on the possible impact of both planned and natural repeated fires and competition with more 'weedy' tree species such as *E. globoidea* and *E. sieberi*.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 290 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 2 locations 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:

Ineligible under Criterion C

It is suspected that there are 10,000 to 40,000 (midpoint 20,000) mature individuals, which exceeds the thresholds for criterion C.

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:

Ineligible under Criterion D

It is suspected that there are 10,000 to 40,000 (midpoint 20,000) mature individuals.

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

References

ALA (2020). Atlas of Living Australia: *Angophora floribunda.* Retrieved from: https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2916127

Brooker, M. I. H. (2000). A new classification of the genus *Eucalyptus* L'Hér. (Myrtaceae). *Australian Systematic Botany*. **13**: 79–148.

Cheal, D., White, M., Machunter, J., & Kohout, M. (2011). The Vegetation of East Gippsland - III. *ARI Tech. Report Series No. 220*. Department of Sustainability and Environment, Victoria.

Cunningham, G. M., Mulham, W. E., Milthorpe, P. L., & Leigh, J. H. (1981). *Plants of Western New South Wales.* Soil Conservation Service NSW.

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

Nicolle, D. (2006). *Eucalypts of Victoria and Tasmania.* Bloomings, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Angophora floribunda.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/e9fd0bfc-8d7d-4ef6-9973-41dfed214c68