Threatened Species Assessment

Eucalyptus globulus subsp. *globulus*
Southern Blue-gum

Taxonomy

Eucalyptus globulus subsp. *globulus* Labill.

All the subspecies of *E. globulus* are notable for the saplings to more than head height, which are conspicuous with large, glaucous juvenile leaves. These can be seen along roadsides or in disturbed areas where the parent trees occur. Coppice growth of similar form can often be seen as new sprouts on upper trunks and branches. *Eucalyptus globulus* is an important plantation species and has been the subject of several studies which have revealed that subspp. *globulus*, *bicostata* and *pseudoglobulus* intergrade extensively. (VicFlora, 2019).

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 A2ce+4ce; B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a tree to 70 m tall; bark smooth, apart from base which has persistent slabs, shedding in large strips and slabs, yellowish or grey. Juvenile leaves sessile, opposite for many pairs on conspicuously winged stems, elliptic to ovate, to 15 cm long, 10.5 cm wide, glaucous; adult leaves petiolate, alternate, falcate or lanceolate, 15-30 cm long, 1.7-3 cm wide, concolorous, glossy, green to dark green; reticulation moderately dense, with numerous, mostly intersectional oil glands. Inflorescences axillary, unbranched; 1-flowered; buds single, sessile, to 2.3 cm long, 1.8 cm diameter, hypanthium obconical; operculum flattened, prominently umbonate, very warty, glaucous or green, scar present; stamens inflexed; anthers cuneate; ovules in (6)8 vertical rows; flowers white. Fruit to 2 cm long, 2.4 cm diameter, sessile or pedicellate, obconical to hemispherical; disc flat to annular; valves 4 or 5, about rim level, partly covered by lobes of disc; seed black-brown, flattened-ellipsoid, shallowly reticulate, hilum ventral. The taxon flowers from November to December (VicFlora, 2019).

Generation Length

The generation length of *Eucalyptus globulus subsp. globulus* is estimated to be 120 to 250 years. This is based on a plausible longevity of 150-500 years. It is also based on the ability of the taxon to resprout from the lignotuber and larger stems, thereby extending the life of the individual beyond the pre-settlement fire intervals ranging from an estimated 45 years in sites influenced by aboriginal burning, and up to 500 years in the wettest sites near streams or coastal habitats protected from fire.

Like most eucalypts in fire-prone dryland habitats, the taxon recruits episodically, from an elevated or soil-stored seedbank, following intense wildfire events, with only a proportion of adults killed by fire, a majority resprouting successfully following each successive fire event. In addition, there may be a low level of opportunistic trickle recruitment in response to outstanding seasonal conditions or localised site disturbance events.

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Distribution

Recent studies of variation in Southern Blue-gums suggest that populations of typical subsp. *globulus* occur in Victoria only in the area south of the Strzelecki Range, e.g., Port Franklin, Wilsons Promontory, and that other populations in South Gippsland and the Otway Ranges probably represent intergrades between subsp. *globulus* and subsp. *pseudoglobulus.* The natural distribution of subsp. *globulus,* in Victoria, has undoubtedly been confused by forestry plantings last century (VicFlora, 2019). Indigenous occurrences of the taxon are reliably recorded also for French Island and Phillip Island in Western Port Bay.

The taxon intergrades with subsp. *pseudoglobulus*, and populations with 1- and 3-flowered trees in southern Gippsland and the Otway Ranges may be impossible to attribute definitely to either subspecies (VicFlora, 2016).

All other records of the taxon throughout Victoria, particularly in the Melbourne and Ballarat regions, but extending as far as Hamilton, Bendigo and the La Trobe Valley, are either plantings, garden escapes or wildings from Tasmanian Blue-gum plantations.

Habitat

The taxon occurs in wet forests on a range of aspects, often in association with *Eucalyptus regnans* or *E. cypellocarpa*.

Threats

The taxon has suffered significant historic decline through habitat loss to agriculture, plantation establishment and township development.

Current threats include continuing incremental habitat loss and degradation to agricultural intensification, urban and tourist development, recruitment failure, death of isolated remnant veteran individuals, genetic introgression from plantations and amenity plantings, and potential gene flow across intergrade stands, particularly in the southern Strzelecki Ranges.

The taxon may also be threatened by increasing fire risk, repeat fire events and recruitment failure in response to climatic drying and warming and imposed anthropogenic fire regimes. Recruiting stands may also be threatened by targeted browsing by native and exotic herbivores including wallabies, rabbits, deer and stock.

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 Endangered

The population reduction over the past 360 to 750 years is estimated to be 50 to 60%, based on (c) and (e) above.

Past decline, particularly in South Gippsland, is based largely on historic habitat loss to agriculture and plantation development.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is estimated to be 20 to 30%, based on (c) and (e) above.

Future decline is based on the impacts of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 360 to 750 year period, including both past and future (up to 100 years in the future), is estimated to be 60 to 75%, 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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 3137 to 14,228 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas.(VBA) The lower bound estimate includes reliable records in coastal districts of South Gippsland and Western Port Bay. The upper bound estimate also includes records in the Otways which are interpreted as intergrades between subspecies *globulus* and *pseudoglobulus* and potentially also some records of plantings, garden escapes or plantation wildings.

The taxon is estimated to be severely fragmented naturally at the regional scale and anthropogenically at the landscape scale with most occurrences at spacings exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal and is likely to be dispersed by ants (myrmecochory) at the metre scale only

It is estimated to have 3 locations based on landscape context and tenure: one for occurrences in parks and reserves, one for occurrences in rural and peri-urban landscapes and one for occurrences in silvicultural landscapes (plantation forests or native forests managed for timber production). The identified threats operate with contrasting intensities in each of these locations.

It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 52 to 272 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 3 locations and has a continuing decline in (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:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals.

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 D2 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

VicFlora (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Eucalyptus globulus* subsp. *pseudoglobulus*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/c71f17d6-fa78-447d-b11e-d382af527820

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