

Eucalyptus forresterae Brumby Sallee

Taxonomy

Eucalyptus forresterae Molyneux & Rule

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

Endangered in Australia

Criteria A3c+4c; B1ab(iii)+2ab(iii)

Species Information

Description and Life History

The taxon is a dwarf (2 - 5 m tall), whipstick, shrubby mallee. Its bark is smooth, off-white or light grey and sheds to green in summer; old bark decorticates into brown to grey sheets and strips. The taxon is distinguished by the following combination of features: its dwarf mallee habit; smooth bark; crowded, small orbicular or cordate, glaucous juvenile leaves; small ovate, shortly petiolate, bluish adult leaves with parallel venation and its relatively dense canopy (SAC 2016). In the nursery trade, *E. forresterae* is known as 'Little Star Gum' (SAC 2016).

E. forresterae is a new taxon that occurs in relatively remote and inaccessible areas of eastern Victoria. It is a 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 taxon as the climate of south-eastern Australia became warmer in the Holocene (Rule and Molyneux 2011; SAC 2016).

Generation Length

The generation length of *Eucalyptus forresterae* is inferred to be 100 to 250 years. This is based on the strongly lignotuberous mallee habit, which extends the life of the taxon well beyond the pre-settlement inferred fire interval of 45-150 years by vigorous basal resprouting. It is also based on an inferred episodic post-fire seed-based recruitment.

Distribution

The taxon is known only from four sites in the Alpine National Park in East Gippsland (Australian Virtual Herbarium, accessed 2015). Three sites are at elevations of 1399-1450 m, with the type locality on the Brumby Point Track separated by about 5 km from the second site (about 1 km north of Diggers Hole Spur Road above Diggers Hole Creek) to the south-west, and about 10 km from the third site on the Nunning Road to the west (Rule and Molyneux 2011). The fourth site, located on a rocky hill above the falls on the Upper Buchan River at Native Dog Flat, is about 16 km NNE of the type locality at an elevation of 1200 m (Rule and Molyneux 2011).

In Victoria, it is restricted to a few high, rocky sites south of the Cobberas, between Native Dog Flat and Brumby point (VicFlora 2018).

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Habitat

The four known populations are restricted to high rocky or well drained elevated sites (Rule and Molyneux 2011). Associated taxa include: *E. sp. aff. dives*, *E. elaeophloia*, *E. glaucescens*, *E. kybeanensis*, *E. mannifera*, *E. pauciflora* subsp. *niphophila*, *E. perriniana*, *E. rubida*, *E. viminalis* subsp. *viminalis* and *Hakea asperma*. A form of *E. dalrympleana* also occurs in the general vicinity of the new taxon (Rule and Molyneux 2011). The only known site where *E. forresterae* and *E. stellulata* occur in close proximity is along the Buchan River valley near Native Dog Flat, where the former occurs on the ridge overlooking the Buchan River Falls and the latter occurs along the valley floor (Rule and Molyneux 2011).

Threats

As with a number of other alpine plants, *E. forresterae* is subject to continuing decline in the quality of its habitat as a consequence of the inferred and projected impacts of climate change (SAC 2016). The bushfires of 2019/20 are thought to have impacted 50% of the taxon's modelled habitat (DELWP 2020). It is thought that the entire small population may have been impacted, but Brumby Point burnt at fairly low intensity, and there may have been no losses (D. Tonkinson pers. comm.), whereas the 2003 fires in this area were at high intensity and resulted in some plant mortality.

The taxon is arguably subject to continuing decline in the quality of its habitat, as a consequence of the inferred and projected impact of climatic drying. It is also based on the elevated temperature thresholds on the recruitment potential of almost all montane to subalpine Victorian Eucalypts, including *E. stellulata* and, by inference, *E. forresterae* (Nitschke and Hickey 2007; Rule and Molyneux 2011).

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;">based on any of the following:</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 A3 as Endangered

The population reduction over the next 100 years is suspected to be 10 to 80% (midpoint 50%), based on (c) above.

The taxon is arguably subject to continuing decline in the quality of its habitat, as a consequence of the inferred and projected impact of climatic drying. It is also based on the elevated temperature thresholds on the recruitment potential of almost all montane to subalpine Victorian Eucalypts, including *E. stellulata* and, by inference, *E. forresterae* (Nitschke and Hickey 2007; Rule and Molyneux 2011). However, it is unclear at what rate the population size is likely to decline and therefore difficult to suggest a future population size.

Eligible under Criterion A4 as Endangered

The population reduction over any 300 to 750 year period, including both past and future (up to 100 years in the future), is suspected to be 30 to 80% (midpoint 50%), based on (c) above. The causes of reduction may not have ceased, be understood or be reversible.

There is no evidence to suggest that the taxon has experienced significant past decline.

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 120 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented at the landscape scale, on account of the small disjunct populations and limited seed dispersal capacity (Rule and Molyneux 2011). This precludes the possibility of recolonisation, in the event of local extinction of subpopulations.

It is estimated to have 1 location, and has a continuing decline in (iii) above as a consequence of the likely impact of climatic drying and elevated temperature thresholds.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 16 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 1 location, and has a continuing decline in (iii) 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 as Data Deficient

The population size is undocumented for each of the four known subpopulations in Victoria.

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 D2 as Vulnerable

The taxon is inferred 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.

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SAC (2016). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 872 *Eucalyptus forresterae*.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Eucalyptus forresterae*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/1da7ddb6-0157-4f05-874e-85c3cf0ee790>