Threatened Species Assessment

Eucalyptus walshii
Little Desert Mallee-box

Taxonomy

Eucalyptus walshii Rule

Prior to its formal description in 2004, the taxon was listed as *E.* aff. *lansdowneana* (Little Desert) in 'A Census of the Vascular Plants of Victoria' (Ross 2000; Ross and Walsh 2003) and in the 'Advisory List of Rare or Threatened Plants in Victoria – 2003' (DSE 2003). and as *E.* sp. aff. *odorata* (Little Desert) in the' Advisory List of Rare or Threatened Plants in Victoria – 2005' (DSE 2005).

Current conservation status

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

Proposed conservation status

Critically Endangered in Australia

Criteria B1ab(iii)+2ab(iii); D

Species Information

Description and Life History

The taxon is a small, slender pole-like tree, 4-9 m tall, with smooth bark that is whitish in summer, light grey in winter, with old bark pale grey-brown, decorticating in thin strips and plates, and with a short basal stocking of box-type bark to less than 1 m high. Juvenile leaves are narrowly lanceolate to elliptic-lanceolate, disjunct, petiolate, dull, blue-grey, becoming lightly pruinose with age, 5-10 cm long and 12-23 mm wide. Adult leaves are lanceolate to ovate-lanceolate, sub-lustrous, blue-green, densely reticulate and copiously glandular, 7-10 cm long and 14-26 mm wide, on petioles to 1.4 cm long. Flowers are in simple axillary umbels on angular peduncles to 1 cm long with 7-11 flowers per umbel. Buds are ovoid-fusiform, with a shortly conical operculum, on pedicels to 4 mm long and fruits are cupular with enclosed valves, 5-6 mm long and 4-5 mm wide (Rule 2005).

Generation Length

The generation length of *Eucalyptus walshii* is inferred to be 60 to 150 years. The lower bound is based on limited circumstantial field observation of a single individual flowering whilst still at the sapling stage, and of one individual showing evidence of senescence at an estimated age of 40-80 years. However, the taxon was only discovered in 1997 and there are no longitudinal data available to provide reliable estimates of the onset of reproductive maturity, average rates of seedling recruitment, seedling, and adult mortality or of longevity. The observed age structure of the type population is unlikely to be representative of the taxon over time and is likely to reflect the recent disturbance history and recruitment success of the only known population. Deductions from the age structure of such a small population are likely to be spurious and misleading and should not be extrapolated to the taxon as a whole (Rule 2005).

The upper bound is inferred from the capacity of most eucalypts to resprout from the lignotuber or from epicormic buds on the stem following severe disturbance to the crown.

Distribution

The taxon is currently known only by the type population in the Little Desert, 350 km west-north-west of Melbourne, in the western Wimmera region in western Victoria (Rule 2005). The stand is located 400 m north of Broughtons Waterhole, on the east side of Broughtons Track, 350 m north of the intersection of Broughtons Track with the McDonald Highway (McDonald Track), Mortat Track and Sambells Track, in the central block of the Little Desert National Park, exactly midway between Kaniva and Goroke (Rule 2004; 2005).

Despite occurring within the Little Desert National Park, the population is by no means secure due to its size. The Little Desert has been reasonably well surveyed over many decades, with the Department of Sustainability and Environment Flora Information System (DSE FIS 2005) holding 1431 site survey or specimen collection records for 936 plant taxa within the boundaries of the Little Desert National Park. This includes 255 records of 20 *Eucalyptus* taxa including 26 records for members of the Mallee Box series Subbuxeales (Brooker and Slee 1996). Of these 26 records, 24 are for *E. wimmerensis* (Wimmera Mallee-box), which is common throughout the Little Desert (Rule 2004). Unvouchered site records of *E. odorata* (Peppermint Box) and *E. porosa* (Black Mallee-box) in the Dimboola area on the north-eastern edge of the Little Desert are of uncertain identity, but are likely to be also referrable to *E. wimmerensis*. This clearly indicates the apparent absence or extreme rarity within the Little Desert of Mallee Box eucalypts other than those referrable to *E. wimmerensis*, strongly supporting the perception of extreme restriction of *E. walshii.* Targeted searches of the immediate vicinity of the type population have failed to locate any additional populations (Rule 2004). Nevertheless, the extent of suitable habitat in relatively remote parts of the Little Desert raises the possibility that additional populations await detection and identification (Rule 2005).

Habitat

The taxon is restricted to a single stand of mallee woodland on siliceous sands on the north side of a low hill near a waterhole in the centre of the Little Desert (Rule 2004). The type population is located within the Lowan Mallee bioregion (DSE FIS 2005). The extreme rarity of the taxon may reflect a high level of habitat specificity, although this is difficult to test without replicate habitat associations at a number of locations (Rule 2005).

The annual rainfall of nearby Nhill is approximately 400 mm, most of which falls in winter (Rule 2004). The taxon grows with *E. wimmerensis* (a closely related species which is distinguished from *E. walshii* by its mallee habit) whilst *E. costata* subsp. *murrayana, E. arenacea,* and *E. leucoxylon* subsp. *pruinosa* occur in the immediate vicinity. *E. sabulosa* and *E. leptophylla* also occur in the area (Rule 2004; VicFlora 2018).

Threats

There are no reliable data to indicate the population trend for the entire taxon, although the population structure of the only known population suggests that recruitment is continuous rather than a very rare episodic event and that, in the absence of any catastrophic event, the population is capable of maintaining its current size at least in the short term (Rule 2005).

The only known population of the taxon is at grave risk of extinction in the wild on account of its extremely small population size, which renders it acutely vulnerable to the effects of stochastic events such as repeated exposure to catastrophic bushfire, drought, disease, or epidemic insect defoliation. The time scale over which extinction is likely to occur depends on the longevity of the current population of individuals, success of seedling recruitment, and management intervention, as well as the timing and nature of catastrophic stochastic events (Rule 2005).

The taxon is equally vulnerable to the impact of unintentional, misguided, or malicious human activity. Illegal seed collection may pose a threat since the taxon is a highly ornamental, mostly smooth-barked, slender tree, although the impact of seed collection is unclear (Rule 2005).

The taxon may also be threatened by the imposition of unfavourable fire regimes, particularly a succession of fires at short intervals, which could eliminate recently recruited individuals before they attain reproductive maturity. Forests in parks and reserves are routinely subjected to planned burning, which has the potential to suppress or eliminate seedling recruitment. Such a regime, if maintained for more than one generation, could lead to the extinction of the taxon (Rule 2005).

In the longer term, habitat modification resulting from climate change and associated changes in the prevailing fire regime may exacerbate this threat. Specifically, the likely increase in the frequency of intense bushfire as a result of global warming is likely to increase the risk of repeat fires at short intervals (Rule 2005).

Mature individuals directly abutting Broughtons Track, which is braided in the vicinity of the type population of the taxon, may be threatened by roadworks and future road realignment, and may also be threatened by firewood or specialty timber collection (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%

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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to have 1 location, as it is currently known only by the type population in the Little Desert, near Broughton's Waterhole.

It has a continuing decline in (iii) above, based on the impact of stochastic events, human activity, roadworks and future road realignment, firewood collection or specialty timber collection, unfavourable fire regimes, particularly a succession of fires at short intervals, and the impact of global warming (Rule 2005).

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is estimated to have 1 location and has a continuing decline in (iii) 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

It is estimated that there are 22 mature individuals, but other thresholds under this criterion have not been met.

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 D as Critically Endangered

The taxon is estimated to have 22 mature individuals. In 2004 there were an additional 14 juveniles and saplings in the population, resulting in a total population size of 36 individuals of all age classes (Rule 2004).

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

References

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