Threatened Species Assessment

Eucalyptus phenax subsp. *phenax*
Green-leaf Mallee

Taxonomy

Eucalyptus phenax subsp. *phenax* Brooker & Slee

The taxon is distinguished from *E. dumosa* by the predominantly glossy green leaves, and more or less sessile buds and fruit. *E. phenax* has been incorrectly known as *E. anceps*, a synonym of the South and Western Australian taxon, *E. rugosa*.

It is thought to hybridise with *E. wimmerensis* at the southern edge of its range to produce the stabilised hybrid *E.* X *macmahonii* (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 A4bce; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a mallee; bark smooth or with loose ribbons at base. Pith of branchlets glandular. Juvenile leaves petiolate, alternate, ovate to lanceolate, dull, green; adult leaves petiolate, alternate, lanceolate, 7-13 cm long, 1-2 cm wide, concolorous, glossy, green; reticulation dense, with erose veinlets, oil glands numerous, mainly intersectional. Inflorescences axillary, unbranched, peduncles to 1.5 cm long, 7-flowered; buds sub-sessile or sessile, oblong, to 1 cm long, 0.5 cm diam., scar present; operculum conical to slightly beaked; stamens inflexed; anthers dorsifixed, cuneate; ovules in 4 vertical rows; flowers white. Fruit sessile, cupular to cylindric, to 0.8 cm long, 0.7 cm diam.; disc descending; valves 4, to rim level; seed lustrous ruby-red, flattish, with distinct, shallow reticulum, hilum ventral. Flowers summer-autumn. (VicFlora 2019).

Generation Length

The generation length of *Eucalyptus phenax* subsp. *phenax* is estimated to be 150 to 300 years. This is based on a plausible longevity of 300 years or more. 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 interval estimated at 45-90 years or more.

Like most eucalypts in fire-prone dryland habitats, the taxon recruits episodically from an elevated or soil-stored seedbank following intense bushfire events, with only a proportion of adults killed by fire and 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.

Distribution

In Victoria, the taxon is restricted to the western Wimmera and Mallee regions north from the Little Desert. It is most common in the Mt Arapiles and Little Desert areas (Nicolle 2006).

The precise distribution of the taxon in Victoria is unclear since there is some uncertainty regarding the reliability of some site and specimen records, particularly those in the Big Desert, Sunset Country, and those in the Mildura district.

The taxon is also found in WA and SA (VicFlora 2019).

Habitat

The taxon is found in level to slightly undulating terrain, in mallee scrub on loamy soils with a variety of other mallee taxa (Nicolle 2006).

While there is some uncertainty regarding the precise distribution of the taxon, circumstantial evidence suggests that it typically occupies more fertile sands, with little evidence that it extended at the time of settlement to heavily modified fertile plains where it was possibly replaced by the closely related *E. dumosa* (Dumosa Mallee).

The habitat range of the taxon implied by specimen records in the AVH suggests the taxon, as currently circumscribed, may represent an aggregate of ecotypes which may represent a number of taxa.

Threats

Threats to the taxon are difficult to assess with confidence, however it is likely to have suffered significant historic decline through habitat loss and degradation in response to agricultural activity, habitat fragmentation, and a wide range of localised edge effects including weed invasion, fire prevention activity, and road construction and maintenance.

Occurrences in highly fragmented rural landscapes continue to be subject to incremental habitat loss and modification in response to agricultural intensification, including illegal roadside clearing and freehold cropping, and to fire management activity on both road reserves and freehold land, as well as throughout all public land including national parks and other reserves.

Stands outside the major parks and reserves are now confined to roadsides or freehold land where they are at risk from recruitment failure, spray drift, illegal cropping, rabbit and stock grazing, and illegal clearing for fire management purposes.

Current and future threats include climatic drying and warming, and imposed anthropogenic fire regimes which act synergistically to increase fire risk, repeat fire events, and extreme drought stress. Recruiting stands may also be threatened by targeted browsing by native and exotic herbivores including wallabies, kangaroos, rabbits, 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 Vulnerable

The population reduction over the last 450 to 900 years is estimated to be 25 to 50% (midpoint 35%), based on (b), (c) and (e) above.

The extent of historic habitat loss is difficult to assess since the precise distribution of the taxon in Victoria is unclear. However, past decline is based largely on habitat loss to agriculture as well as habitat degradation in response to agricultural activity, habitat fragmentation and a wide range of localised edge effects.

The causes of 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 projected to be 25 to 45%, based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 450 to 900 year period, including both past and future (up to 100 years in the future), is estimated to be 35 to 80% (midpoint 45%), based on (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 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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 52 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale. All geographically isolated stands occur at spacings that exceed 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 2 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the continuing impact of the identified threats.

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 no available estimate of population size for taxon in Victoria.

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.

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

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Eucalyptus phenax* subsp. *phenax*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/60c3cd9d-5527-48ac-b04a-f720f9490472