Threatened Species Assessment

Eucalyptus pyrenea
Pyrenees Gum

Taxonomy

Eucalyptus pyrenea Rule

Nicolle (2006) regards *E. pyrenea* as a disjunct occurrence of the Grampians endemic *E. alaticaulis,* which displays some morphological characters of *E. cypellocarpa*.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

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

Species Information

Description and Life History

The taxon is a tree to 18 m tall; bark smooth, grey or white above, with some thin, rough bark on lower part of trunk. Juvenile leaves sessile, opposite for many pairs, ovate to elliptical-ovate, to 13 cm long, 9 cm wide, discolorous, glossy, blue-green above; adult leaves petiolate, alternate, lanceolate, 12-25 cm long, 2-3.4 cm wide, concolorous, glossy, green, reticulation dense, with numerous island and intersectional oil glands. Inflorescences axillary, unbranched; peduncles slender, flattened, to 1.6 cm long, 7-flowered; buds shortly pedicellate, ovoid-cylindric with conical operculum, angle often continuing from pedicel along hypanthium, to 0.8 cm long, 0.4 cm diam., scar present; stamens irregularly flexed; anthers dorsifixed, oblong; ovules in 4 vertical rows; flowers white. Fruit pedicellate, cylindric to truncate-ovoid, to 0.6 cm long, 0.6 cm diam.; disc descending; valves 3 or 4, rim level or below; seed dark brownish-black, flattened-ellipsoid, shallowly reticulate, hilum ventral (VicFlora 2018).

Generation Length

The generation length of *Eucalyptus pyrenea* is estimated to be 70 to 150 years. This is based on a plausible longevity of 150 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 35-70 years or more.

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.

Distribution

The taxon is a Victorian endemic, apparently restricted to the Pyrenees Ranges, west of Avoca (VicFlora 2018). Most specimens in the Australian Virtual Herbarium (AVH) have been collected from the type population in the vicinity of Mountain Hut Track, 6-7 km from the Pyrenees Highway, south-east of Mt Avoca in the Pyrenees Range State Forest. In 1994 a specimen was also collected 4 km along Lookout Track, west of the Avoca Winery and a lookout, west of Percydale.

Habitat

The taxon occurs on dry rocky slopes (VicFlora 2018). Specimen data in the AVH records the habitat of the taxon as woodland with grassy and low heathy understorey on steep terrain where typically associated with *Eucalyptus aromaphloia*, *E. globulus* subsp. *bicostata*, *E. goniocalyx*, *E. melliodora*, *E. macrorhyncha*, *Acacia paradoxa*, *A. genistifolia*, *Epacris impressa*, *Joycea pallida*, *Poa sieberiana*, *Pimelea humilis* and *Gonocarpus tetragynus*. Substrates are dark orange rocky to skeletal clay loam. The taxon occurs at elevations above 600 m.

Threats

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. Acting in concert, these threats increase the risk of adult mortality, recruitment failure and local extinction. Recruiting stands may also be threatened by targeted browsing by native and exotic herbivores including wallabies, kangaroos, rabbits, feral deer and stock.

In comparison with these threats, timber harvesting is not considered a significant current threat given the relatively low site productivity of the dry rocky habitat and the inferred capacity of the taxon to resprout from the lignotuber.

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 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 difficult to assess with any confidence since the identified threats operate stochastically and with unpredictable intensity.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 210 to 450 year period, including both past and future (up to 100 years in the future), is estimated to be 25 to 45%, based on (c) and (e) above.

The extent of historic decline is unlikely to approach the 30% threshold, since the only known occurrences are on public land unsuitable for agricultural or forestry 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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 8 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 be severely fragmented naturally at the landscape scale with geographically isolated stands separated by distances 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.

A single location is identified since the identified threats operate consistently across the very restricted known range of the taxon.

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

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 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) 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:

Eligible under Criterion C as Endangered

It is estimated that there are 300 to 2,000 (midpoint 1,000) mature individuals. Field observations suggest it is in the range of a few hundred to a thousand mature individuals, and may even exceed the 1000 threshold.

There is estimated to be a continuing decline of 25 to 45% within two generations.

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 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

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

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Eucalyptus pyrenea*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/f937d01a-d9b1-4ef7-93df-813ed293723d.