Notice of Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to list the tree *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act and, as a consequence, to omit reference to *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl in Part 3 of Schedule 1 (Vulnerable Species) of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

How to make a submission

The NSW TSSC welcomes public involvement in the assessment process and places preliminary determinations on public exhibition on the NSW TSSC pages on the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) website. This public exhibition provides an opportunity for the public to comment on this preliminary determination as well as provide any additional information that is relevant to the assessment.

Postal submissions regarding this Preliminary Determination may be sent to:

Secretariat
NSW Threatened Species Scientific Committee
Locked Bag 5022
Parramatta NSW 2124.

Email submissions in Microsoft Word or PDF formats to:
scientific.committee@environment.nsw.gov.au

Submissions close 17 April 2025

What happens next?

After considering any submissions received during the public exhibition period the NSW TSSC will make a Final Determination and a notice will be placed on the NSW DCCEEW website to announce the outcome of the assessment. If the Final Determination is to support a listing, then it will be added to the Schedules of the Act when the Final Determination is published on the legislation website. www.legislation.nsw.gov.au.

Privacy information

The information you provide in your submission may be used by the NSW TSSC in the assessment to determine the conservation status and listing or delisting of threatened or extinct species, threatened populations and threatened or collapsed ecological communities or to assess key threatening processes.

The NSW TSSC may be asked to share information on assessments with NSW Government agencies, the Commonwealth Government and other State and Territory governments to collaborate on national threatened species assessments using a common assessment method and to assist in the management of species and ecological communities.

If your submission contains information relevant to the assessment it may be provided to state and territory government agencies and scientific committees as part of this collaboration.

If you wish your identity and personal information in your submission to be treated as confidential you must:

- *request your name be treated as confidential*, and
- *not include any of your personal information in the main text of the submission or attachments so that it can be easily removed.*

Professor Caroline Gross
Chairperson
NSW Threatened Species Scientific Committee

Public Exhibition period: 17/01/2025 – 17/04/2025

Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to list the tree *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act and, as a consequence, to omit reference to *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl in Part 3 of Schedule 1 (Vulnerable Species) of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Eucalyptus oresbia J.T.Hunter & J.J.Bruhl as was found to be Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.2(1 b)(2 c) and Clause 4.3(b)(d)(e i,iii) because: 1) the species is suspected to have undergone a large population reduction of >50% over a three-generation period of 306 years due to historical clearing for agriculture and pine plantations; 2) the species has a highly restricted area of occupancy (44 km^2) and extent of occurrence (420 km^2); 3) the species is known from 3–4 threat-defined locations; and 4) continuing decline is inferred in the area, extent and quality of habitat and the number of mature individuals due to conflicting land uses such as plantation forestry and agriculture in prime *E. oresbia* habitat, adverse fire regimes, the maintenance of tracks and trails, and the invasion of weeds such as blackberry and radiata pine.

The NSW Threatened Species Scientific Committee has found that:

1. *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl (family Myrtaceae) is described by Hunter and Bruhl (1999) as a “Tree to 30 m tall. Bark smooth white, yellow or cream, rarely grey, sock absent or rarely present on younger trees to 1 m. Juvenile stems and branchlets usually strongly quadrangular. Leaves: seedling leaves ovate to elliptic, 3–10 cm long, 1–3.5 cm wide, plane, opposite, apex acute to obtuse, base rounded or ± caudate, petiolate at first and then a few pairs sessile, concolorous; intermediate leaves ovate to lanceolate, 12–18 cm long, 3–6.5 cm wide, sub-opposite to alternate, apex acute to acuminate, ± hooked, base rounded to ± oblique; adult leaves lanceolate, falcate or ± plane, 9.5–18 cm long, 1.2–2.2 cm wide, alternate, conspicuously glossy and dark green, margins entire, apex acuminate and often hooked, base attenuate, acute or oblique, petiole terete to flattened, barely channelled above, 1–2 cm long; venation 30–45° to midrib, intramarginal vein 0.5–2 mm from the margin, midrib channelled above. Inflorescence of axillary umbellasters. Flowers 6–7 per axil; peduncle 8–17 mm long, 2–5 mm wide; pedicel distinct in bud and fruit, 3–5 mm long in buds, 2–4.5 mm long in fruit; buds obloid to clavate, bulbous above and below the suture, ± 1-ribbed, 6–9.5 mm long; calyptra peaked hemispherical, acutely obconical or ± rostrate, 2.5–5 mm long, 2–3.5 mm wide; hypanthium 2.5–5 mm long, 2–3.5 mm wide; style terete, 3–4 mm long; stamens with filaments 3.5–5 mm long, anthers dorsifixed, parallel, dehiscence longitudinal, 0.4–0.6 mm long, white, oil gland orbicular and abaxial. Fruit cupular, ± 1-ribbed, 4.5–8 mm long, 5–8 mm wide, often

splitting on one side; disc level to descending, c. 1 mm wide; valves 3, ± level. Seeds red-brown to black. Cotyledons bilobed."

2. *Eucalyptus oresbia* is a range-restricted species endemic to several small, disjunct sites near the town of Nundle on the New South Wales (NSW) Northern Tablelands (Hunter and Bruhl 1999; OEH 2021). *Eucalyptus oresbia* is currently known from four disjunct sites. The core area is around the type locality at Hanging Rock, due east of Nundle, with smaller outlying stands known from the Scotts Creek area near Murrurundi to the south, in the Dungowan Dam catchment area northeast of Nundle, and in Ben Halls Gap National Park southeast of Nundle. Given the minimum distance between these sites is approximately 11 km, each is considered a separate subpopulation per the IUCN (2024) definition.

3. The minimum estimated population size of *Eucalyptus oresbia* is 6,458-6,708 mature individuals. Approximately 92-96% of the known population occurs within the Hanging Rock subpopulation, and less than 1% of the known individuals occur on lands managed for conservation in the Ben Halls Gap and Dungowan Dam subpopulations.

4. *Eucalyptus oresbia* has a highly restricted geographic distribution. The Area of Occupancy (AOO) of *Eucalyptus oresbia* is estimated to be 44 km^2 using 2 x 2 km grid cells, the scale recommended by IUCN (2024). The Extent of Occurrence (EOO) is estimated to be 420 km^2 and is based on a minimum convex polygon enclosing a cleaned dataset of known occurrences of the species, the method of assessment recommended by IUCN (2024). Both EOO and AOO were calculated using ArcGIS (Esri 2021).

5. *Eucalyptus oresbia* is known from steep slopes on soils derived from mudstone and basalt, typically at elevations of 800–1,100 m (Hunter and Bruhl 1999; Hunter and Copeland 2007), though records are known from as low as 600 m at the Scotts Creek subpopulation. It is found in steep-sided valleys and drainage lines with south to southwest aspects that provide a warm yet moist microclimate (Hunter and Copeland 2007). In these steep valleys it commonly associates with *Eucalyptus laevopinea*, *E. melliodora, Angophora floribunda* and *Casuarina cunninghamiana*, with other co-occurring species including *Eucalyptus malacoxylon*, *E. youmanii*, *E. caliginosa, Allocasuarina torulosa, Cassinia laevis, C. macrocephala, Acacia dealbata, A. implexa, A. obtusifolia, Exocarpos cupressiformis, Poa sieberiana* and *Lomandra longifolia* (Hunter and Copeland 2007).

6. The largest *Eucalyptus oresbia* have been recorded as having a diameter at breast height (DBH) of up to 126 cm (Hunter and Copeland 2007), suggesting stem ages of over 300 years are possible assuming growth rates are similar to those seen in other temperate forest eucalypts (Wood *et al.* 2010). However, most *Eucalyptus oresbia* recorded in mature stands are often only up to 70 cm DBH (likely due to previous disturbance cycles; Hunter and Copeland 2007), meaning that the maximum age of the current cohort is more likely to be 150-250 years. The generation length of *E. oresbia* is estimated at approximately 102 years.

7. The main threats to *Eucalyptus oresbia* are the historical clearing of habitat for softwood pine plantations at Hanging Rock and the ongoing maintenance of these plantations including timber harvesting operations, historical and current clearing

for agriculture and grazing, and adverse fire regimes which are projected to worsen under climate change (Hunter and Copeland 2007; OEH 2021). Other identified threats to *E. oresbia* include road maintenance operations, and invasion by weeds such as blackberries (*Rubus anglocandicans*) and radiata pine (*Pinus radiata*) (Hunter and Copeland 2007; OEH 2021). 'Clearing of Native Vegetation', 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', 'Anthropogenic climate change', and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants' are listed as Key Threatening Processes under the Act.

8. When the threat of adverse fire regimes, especially increased frequency and severity of wildfires, is considered, the four subpopulations of *Eucalyptus oresbia* can be considered to be 3–4 threat-defined locations, as per the IUCN (2024) definition. This is due to the increased frequency and severity of wildfires being the most serious plausible threat that results in the lowest number of locations for the taxon.

9. There is approximately 2,676 ha of south-facing slope habitat in and around confirmed records of *E. oresbia*, and analysis of satellite imagery and land use mapping shows that approximately 1,829 ha of this putatively suitable habitat has been cleared. This represents an estimated reduction in the area of available habitat for *E. oresbia* of 68%, with a population reduction equivalent to that amount being inferred to have occurred within the three-generation timeframe of 306 years. Given *E. oresbia* has been recorded recruiting into previously cleared habitat within plantation areas (Hunter and Copeland 2007), it is suspected that *E. oresbia* would have dominated the canopy in a larger area of habitat than at present. As <1% of the population is in conservation reserves, large areas of potential habitat are still maintained as softwood pine plantations preventing regeneration in the Hanging Rock subpopulation, and small-scale clearing may still be a threat in the Scotts Creek subpopulation, land clearing is not considered to have ceased, and may not be reversible in more heavily modified areas.

10. Continuing decline of *Eucalyptus oresbia* is inferred in the area, extent and quality of habitat and the number of mature individuals due to land uses such as plantation forestry and agriculture in prime *E. oresbia* habitat, the maintenance of tracks and trails, and the invasion of weeds such as blackberry and radiata pine. While much of the clearing in the region in which *E. oresbia* occurs has been historical, the ongoing maintenance and harvesting of pine plantations, and ongoing stock grazing in *E. oresbia* habitat causes the direct mortality of seedlings and suppresses ongoing recruitment through the direct destruction of plants in otherwise suitable habitat. Road and track maintenance also results in the death of substantial numbers of plants on the immediate road edges in the large Hanging Rock subpopulation (G. Phillips pers. obs. August 2024) and reduces recruitment opportunities in disturbed areas that typically contain the highest seedling counts (Hunter and Copeland 2007). The presence of weeds such as blackberry and radiata pine, which can alter the habitat quality of *E. oresbia* by making it more flammable, less conducive to seedling growth, and change soil chemistry, further contribute to habitat degradation. Adverse fire regimes may also contribute to continuing decline by the elimination of stems capable of resprouting and increased mortality of mature individuals if severe fires were to become more frequent in the

habitat of *E. oresbia*, as seen in other forest eucalypts (Etchells *et al.* 2020; Zimmer *et al.* 2021). These threats mean that the quality and availability of habitat and number of mature individuals of *E. oresbia* are likely to remain under pressure, with current declines inferred to continue into the future.

11. *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl is not eligible to be listed as a Critically Endangered species.

12. *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl is eligible to be listed as an Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a very high risk of extinction in Australia in the near future as determined in accordance with the following criteria as prescribed by the Biodiversity Conservation Regulation 2017:

Assessment against *Biodiversity Conservation Regulation 2017* criteria
The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome: *Eucalyptus oresbia* was found to be Endangered under Clause 4.2(1 b)(2 c) and Clause 4.3(b)(d)(e i,iii).

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Endangered under Clause 4.2(1 b)(2 c)

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 - Restricted geographic distribution of species and other conditions
(Equivalent to IUCN criterion B)
Assessment Outcome: Endangered under Clause 4.3(b)(d)(e i,iii)

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,

and at least 2 of the following 3 conditions apply:						
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,				
	(e)	there is a projected or continuing decline in any of the following:				
		(i)	an index of abundance appropriate to the taxon,			
		(ii)	the geographic distribution of the species,			
		(iii)	habitat area, extent or quality,			
		(iv)	the number of locations in which the species occurs or of populations of the species,			
	(f)	extreme fluctuations occur in any of the following:				
		(i)	an index of abundance appropriate to the taxon,			
		(ii)	the geographic distribution of the species,			
		(iii)	the number of locations in which the species occur or of populations of the species.			

Clause 4.4 - Low numbers of mature individuals of species and other conditions
(Equivalent to IUCN criterion C)
Assessment Outcome: Data deficient

The estimated total number of mature individuals of the species is:						
	(a)	for critically endangered species			very low, or	
	(b)	for endangered species			low, or	
	(c)	for vulnerable species			moderately low,	
and either of the following 2 conditions apply:						
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):				
		(i)	for critically endangered species		very large, or	
		(ii)	for endangered species		large, or	
		(iii)	for vulnerable species		moderate,	
	(e)	both of the following apply:				
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and			
		(ii)	at least one of the following applies:			
			(A)	the number of individuals in each population of the species is:		
				(I)	for critically endangered species	extremely low, or
				(II)	for endangered species	very low, or
				(III)	for vulnerable species	low,
			(B)	all or nearly all mature individuals of the species occur within one population,		
			(C)	extreme fluctuations occur in an index of abundance appropriate to the species.		

Clause 4.5 - Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Not met

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 - Quantitative analysis of extinction probability
(Equivalent to IUCN criterion E)
Assessment Outcome: Data deficient

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species– vulnerable species
(Equivalent to IUCN criterion D2)
Assessment Outcome: Not met

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.

Professor Caroline Gross
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Phillips GP (2024) Conservation Assessment of *Eucalyptus oresbia* J.T.Hunter & J.J.Bruhl (Myrtaceae). NSW Threatened Species Scientific Committee.

References:

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Etchells H, O'Donnell AJ, McCaw WL, Grierson PF (2020) Fire severity impacts on tree mortality and post-fire recruitment in tall eucalypt forests of southwest Australia. *Forest Ecology and Management* **459**: 117850.

Hunter JT, Bruhl JJ (1999) Two new species of *Eucalyptus* (Myrtaceae) from northern New South Wales (series *Viminales* section *Maidenaria*). *Telopea* **8(2)**: 257–263.

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IUCN (2024) Guidelines for Using the IUCN Red List Categories and Criteria. Version 16 (March 2024). Standards and Petitions Committee of the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

OEH (Office of Environment and Heritage) (2021) Small-fruited Mountain Gum – profile. URL: https://threatenedspecies.bionet.nsw.gov.au/profile?id=10303(accessed 16 April 2024).

Wood SW, Hua Q, Allen KJ, Bowman DMJS, (2010) Age and growth of a fire prone Tasmanian temperate old-growth forest stand dominated by *Eucalyptus regnans*, the world's tallest angiosperm. *Forest Ecology and Management* **260**: 438‑447.

Zimmer H, Allen J, Smith R, Gibson R, Auld T (2021) Post-fire recruitment and resprouting of a threatened montane eucalypt. *Australian Journal of Botany* **69**: 21-29.