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Notice of and reasons for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the tree *Uromyrtus australis* A.J.Scott as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Uromyrtus australis* A.J. Scott from Part 2 of Schedule 1 (Endangered species) of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Uromyrtus australis A.J.Scott was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(a)(d)(e i,iii) because: (1) it has a very highly restricted geographic distribution with an extent of occurrence of 89 km^2; (2) it is inferred to be severely fragmented and occurs in one threat-defined location; and (3) continuing decline in the area, extent and quality of habitat, and the number of mature individuals is estimated due to the combined and interactive threats of myrtle rust and adverse fire regimes (particularly high frequency fire and high severity fire).

The NSW Threatened Species Scientific Committee has found that:

1. *Uromyrtus australis* A.J.Scott (family Myrtaceae) is a small sub-canopy to canopy rainforest tree to 12 m described as “Bark of main stem smooth, grey. Branchlets rounded to laterally com- pressed, brown to reddish brown; the bark smooth or slightly flaky, sericeous but soon glabrous; oil glands absent or indistinct and sparse. Leaves discolorous, usually very glossy above, matte below. Petioles sparsely short sericeous, 2.5–4.5 mm long, smooth to slightly rugulose, brown to reddish, smooth to somewhat channelled above, more or less glandular. Leaf blades narrowly elliptic to narrowly ovate, 23–50 mm long, 10—22 mm wide; base cuneate; apex acuminate, the tip rounded; upper surface sparsely sericeous when young but becoming glabrous; oil glands invisible or absent; "midvein" often as 2 slightly raised veins with depression between them (particularly at base); lower surface glabrous; oil glands absent; midvein raised throughout (especially at base), intramarginal vein generally obscure. Inflorescence a monad; peduncles 6–12 mm long, more or less sericeous. Bracteoles 1.5–3 mm long, 0.4–0.8 mm wide, linear to narrowly obtriangular, sparsely sericeous, the tips exceeding base of sepal lobes in bud. Hypanthium 2.0–2.3 mm long, densely short sericeous. Sepals 5; lobes greenish, broadly ovate to rounded; apex obtuse, 1.4–2.3 mm long, glabrous to somewhat sericeous (especially on margins) above, glabrous to densely short sericeous below. Petals 5, white or often mottled with pink or magenta, widely ovate to widely obovate, 6–7 mm long, 4.5–5 mm wide; upper surface sparsely sericeous in middle; lower surface glabrous, oil glands common. Stamens 65–120; filaments 1.5–2.5 mm long. Staminal disk glabrous. Ovary apex glabrous. Anther sacs narrowly cylindrical, 0.5–0.8 mm long; connective wider than and projecting well beyond anther sacs, apex of connective rounded with single large apical gland, up to 12 smaller oil glands between sacs. Style up to 6.5 mm long; stigma terete to slightly capitate. Berry globose, 7-9 mm long, 6–9 mm wide, glabrous, dark blue-black; peduncles 9–12 mm long. Locules 3; placenta capitate; ovules 10–16 per

placenta, borne irregularly or in 2 distinct rows. Seeds 1–6, 3.5–4 mm long, coat hard, bony. Embryo C-shaped; cotyledon characters uncertain" (Snow and Guymer 2001).

2. *Uromyrtus australis* is endemic to New South Wales (NSW) (Snow and Guymer 2001) where it is restricted to the South Eastern Queensland bioregion (Commonwealth DCCEEW 2012) within Nightcap National Park (NP), Mount Jerusalem NP, and Whian Whian State Conservation Area (SCA), west of Mullumbimby (OEH 2018). The distribution of *U. australis* occurs on the traditional lands of the Bundjalung and Yugambeh peoples (Horton 1996; Native Land Digital 2024).

3. The extent of occurrence (EOO) was calculated at 89 km^2 and is based on a minimum convex polygon enclosing cleaned mapped occurrences of the species, the method of assessment recommended by IUCN (2024). The area of occupancy (AOO) is estimated to be 88 km^2 and was calculated using 2 x 2 km grid cells, the scale recommended by IUCN (2024).

4. There is uncertainty around the number of subpopulations of *Uromyrtus australis*, as per the IUCN (2024) definition. Genetic analysis has shown that, despite the detection of differentiated clusters, *U. australis* has low genetic diversity and high similarity, suggesting a single subpopulation that once had high levels of connectedness (Yap and Rossetto 2020). The species is capable of producing viable seed (Kooyman 2005), but no seedling recruitment has ever been observed despite extensive surveys (R. Kooyman *in litt.* September 2024) and no or very little seed is now produced due to myrtle rust (*Austropuccinia psidii*) (R. Kooyman *in litt.* January 2025). Given the species appears to persist in clonal populations that spread vegetatively via suckering (Kooyman 2005), effective gene flow between genets may have largely ceased and connectivity is probably based on vegetative spread.

5. *Uromyrtus australis* produces suckers (ramets) from the roots (NPWS 2003). The IUCN (2024) states that "as a general rule, the ramet, *i.e*., the smallest entity capable of both independent survival and (sexual or asexual) reproduction should be considered a 'mature individual'". Prior to myrtle rust, which was first observed on *Uromyrtus australis* in 2018, the number of stems (ramets) was estimated at around 10,000 (R. Kooyman *in litt.* December 2024). The current number of ramets is unknown but surveys in 2024 counted 3,286 in monitoring plots (R. Kooyman *in litt.* September 2024). The number of genets is estimated at *c.* 300 (R. Kooyman *in litt.* September 2024) and this number is declining due to the combined impacts of fire and myrtle rust, resulting in continuing decline in the number of mature individuals and a significant decline in the health of individuals across the species' distribution (Kooyman 2024).

6. *Uromyrtus australis* occurs in warm temperate rainforest (simple notophyll vine forest) dominated by *Ceratopetalum apetalum* and occasionally *Lophostemon confertus* (R. Kooyman *in litt.* December 2024). The species has an elevational range of 200–700 m above sea level (Snow and Guymer 2001) but occurs predominantly above 600 m on nutrient-poor podzolic soils derived from rhyolite (NPWS 2003). Sites typically adjoin tall wet eucalypt forest with *Eucalyptus campanulata*, *E. microcorys*, *E. pilularis*, *Corymbia intermedia*, and *Syncarpia glomulifera* (R. Kooyman *in litt.* December 2024).

7. *Uromyrtus australis* appears to have some capacity to persist after fire due to its ability to produce suckers. However, amongst fire-affected genets, high levels of ramet mortality were recorded following the 2019–2020 fires (DPE 2023). The species is largely confined to refugial rainforest habitat which very rarely burns (Rossetto and Kooyman 2005). The species has been observed to produce suckers in response to mechanical disturbance, such as the slashing of roadsides in the former Whian Whian State Forest (Kooyman 2000, cited in NPWS 2003).

8. Post-dispersal seed predation by invertebrates appears to be the most likely cause of recruitment limitation (Kooyman 2005). More recently, myrtle rust has emerged as an agent limiting the potential for sexual reproduction. Since 2018, no significant fruiting events have been observed (NSW DCCEEW 2024) and no or little seed is now produced (R. Kooyman *in litt.* January 2025). The species does not appear to have a viable long-lived soil seed reserve, with seed viability limited to around 20 weeks (Kooyman 2005).

9. *Uromyrtus australis* is threatened by myrtle rust, adverse fire regimes (particularly high frequency fire and high severity fire), and habitat disturbance from road maintenance. Historical land clearing and forestry operations (R. Kooyman *in litt.* September 2024) are likely to have adversely affected the species. 'Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae', 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Clearing of native vegetation' are listed as Key Threatening Processes under the Act.

10. *Uromyrtus australis* occurs at one threat-defined location as per the IUCN (2024) definition. This is based on the most serious plausible threat which results in the lowest number of locations being disease and death caused by infection with myrtle rust. Myrtle rust already affects *U. australis* across most of its range (R. Kooyman *in litt.* September 2024) and the spores of myrtle rust are widely dispersed by wind (Westaway 2016).

11. *Uromyrtus australis* is inferred to be severely fragmented as >50% of its population occurs in habitat patches that are (1) smaller than would be required to support a viable population, and (2) separated from other habitat patches by a large distance relative to the likely dispersal kernel of the species, as per the IUCN (2024) definition. It is inferred that there is an absence of gene flow throughout the population as most, if not all, reproduction is limited to suckering. Given *U. australis* grows very slowly (Kooyman 2005), once a subpopulation is lost, recolonisation is unlikely to occur. The very highly restricted geographic distribution coupled with the species' slow growth and long lifespan suggests that most (>50%) of habitat patches are unlikely to be viable in the long-term, due to the threats of myrtle rust and adverse fire regimes, particularly high frequency fire and high severity fire. This is evidenced by the loss of five genets to fire in 2019–2020 (NSW DCCEEW 2024) and the widespread dieback of small ramet stems and increasing loss of larger stems due to infection with myrtle rust (NSW DCCEEW 2024; Kooyman 2024). The recent failure to flower and set fruit due to myrtle rust (R. Kooyman *in litt.* September 2024) further limits the possibility of recolonisation if a subpopulation is lost.

12. Continuing decline in the number of mature individuals and the area, extent and quality of habitat is estimated due to the combined and interactive threats of myrtle rust and adverse fire regimes, particularly high frequency and high severity fire.

13. Since 2020, 40 sites across the distribution of *Uromyrtus australis* have been annually monitored for myrtle rust (NSW DCCEEW 2024). Across these sites, myrtle rust is causing widespread dieback of canopy branchlets (canopy thinning) and small ramet stems, with increasing loss of larger stems (NSW DCCEEW 2024; Kooyman 2024). Furthermore, infection has resulted in widespread failure to flower and fruit (R. Kooyman *in litt.* September 2024) and no significant fruiting events have been observed since 2018 (NSW DCCEEW 2024). Approximately 80% of *U. australis* genets are currently affected by myrtle rust (R. Kooyman *in litt.* September 2024) with ~10% on the brink of mortality or in serious decline (R. Kooyman *in litt.* December 2024). In 2024, approximately 25% of monitored genets were recorded with high to extreme myrtle rust impacts, and ~59% with moderate impacts (R. Kooyman *in litt.* September 2024). Myrtle rust infection is increasing, leading to increasing declines of ramets and genets (R. Kooyman *in litt.* September 2024). Genetic sampling indicates that affected individuals are not genetically distinct from unaffected individuals (Yap and Rossetto 2020), suggesting that few if any individuals are resistant to infection.

14. Fires in 2019–2020 resulted in approximately 30% of the *Uromyrtus australis* distribution being burnt and ~10% of the adult population killed or severely affected (R. Kooyman *in litt.* September 2024). At least five genets were killed by fire in the Nightcap NP area (NSW DCCEEW 2024), resulting in a loss of genetic diversity and evolutionary potential (Yap and Rossetto 2020; R. Kooyman *in litt.* September 2024). Thirty-four (29%) of 118 monitored genets in the Nightcap area were found to be burnt following the 2019–2020 fires (DPE 2023). Detailed assessment of fire-impacts to ramets in three 20 x 30 m quadrats found high levels of ramet mortality. In the two Nightcap NP quadrats, 100% of smaller stems (<2m), 80% of medium stems (2–10m), and 52% of large stems (>10m) were killed by the 2019–2020 fires (DPE 2023). In the single Mount Jerusalem quadrat, 64% of smaller stems, 41% of medium stems, and 0% of large stems were documented to have been killed by the 2019–2020 fires (DPE 2023). The ability of some individuals to resprout following fire confers some capacity to persist in response to single fire events. However, the high mortality of ramets and loss of some genets indicates a low tolerance of fire, with survival likely to be lowest after high severity fire. Furthermore, repeated short interval fires can lead to depressed or failed resprouting in resprouting species (Karavani *et al.* 2018; Fairman *et al.* 2019).

15. Climate change projections indicate a future trend of increased frequency of severe fire weather, more prolonged and severe drought influencing the moisture content and availability of fuels to burn, and more frequent fires (Abatzoglou *et al*. 2019; Dowdy *et al*. 2019; Jones *et al*. 2022). The North Coast region is projected to become hotter, have more hot days over 35°C, have more dangerous fire weather days, and have a longer fire season by 2079 (BOM and CSIRO 2022; AdaptNSW 2024). Regionally, it is projected with high confidence that climate change will result in a harsher fire-weather climate in the future (CSIRO 2024). It is plausible that these changes will lead to more frequent, intense, and severe fires, and changes in fire season, which will in turn adversely affect the *Uromyrtus australis* population in the future.

16. Considerable areas within and adjacent to the species' habitat and natural distribution were variously cleared and adversely affected by historic clearing for agricultural pursuits, forestry operations and expansion of the extent of commercial eucalypt species (R. Kooyman *in litt.* September 2024). Although logging of rainforest has ceased, historical logging may have affected the natural topographic-wetness patterns in the landscape that protected the core-moist refugial habitat of *U. australis* from fire and drying (R. Kooyman *in litt.* September 2024; Kooyman 2024). Following the 2019–2020 fires, a secondary round of disturbance-related dieback and tree mortality in the *Ceratopetalum apetalum* dominated rainforests was triggered, resulting in significant intrusion of pyric (non-rainforest) elements, such as *Acacia orites*, into previously rainforest-dominated areas (Kooyman 2024). Consequently, *U. australis* now has a more constrained distribution that is at high risk from threatening processes, particularly recurrent fire, which is further exacerbated by the post-fire establishment of pyric elements in the species' habitat (R. Kooyman *in litt.* September 2024).

17. *Uromyrtus australis* A.J.Scott is eligible to be listed as a Critically Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing an extremely high risk of extinction in Australia in the immediate 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: *Uromyrtus australis* was found to be Critically Endangered under Clause 4.3(a)(d)(e i,iii).

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Data Deficient

(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: Critically Endangered under 4.3(a)(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: Vulnerable under Clause 4.4(c)(d iii)

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 Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Saunders M (2025) Conservation Assessment of *Uromyrtus australis* A.J.Scott (Myrtaceae). NSW Department of Climate Change, Energy, the Environment and Water.

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