Conservation Assessment of *Uromyrtus australis* A.J.Scott (Myrtaceae)

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Uromyrtus australis A.J.Scott (Myrtaceae)

Distribution: Endemic to NSW
Current EPBC Act Status: Endangered
Current NSW BC Act Status: Endangered

Proposed listing on NSW BC Act: Critically Endangered

Reason for change: *Uromyrtus australis* was originally listed as Endangered on the *Threatened Species Conservation Act 1995*, the highest category under the legislation at that time. In 2005, the *Threatened Species Conservation Act 1995* was amended to provide for the listing of Critically Endangered species, but the eligibility of *U. australis* for listing as a Critically Endangered species has not been assessed until now. This new assessment has found that the species meets the IUCN Red List criteria for Critically Endangered status.

Summary of Conservation Assessment

Uromyrtus australis was found to be Critically Endangered under IUCN Criterion B1ab(iii,v).

The reasons for the species being eligible for listing in the Critically Endangered category are: (1) it has a very highly restricted geographic distribution with an extent of occurrence of 89 km^2; (2) it 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).

Uromyrtus australis. Photo: Justin Mallee/DCCEEW.

Description and Taxonomy

Uromyrtus australis A.J.Scott, also known as the peach myrtle, is a conventionally accepted species in the family Myrtaceae (CHAH 2024; PlantNet 2024). *Uromyrtus australis* is a small sub-canopy to canopy rainforest tree to 12 m described as "bark of larger stems reddish brown and slightly flaky. Branchlets rounded to laterally compressed, brown to reddish brown. Leaves sericeous in early stages of development but soon glabrous, simple, opposite, entire, discolorous, glossy above, matte below, oil glands absent or indistinct and sparse. 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, 25–50 mm long, 10–22 mm wide; base rounded to cuneate; apex acuminate, the tip rounded; upper surface sparsely sericeous when young, becoming glabrous; oil glands invisible or absent; 'midvein' often as 2 slightly raised veins with a depression between them (most evident 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 densely short sericeous below. Petals 5, white turning pink to magenta with age, widely ovate to obovate, 6–7 mm long, 4.5–5 mm wide; upper surface sparsely sericeous toward middle; lower surface glabrous, oil glands common. Stamens 65–120, forming a crowded mass at base of the style; filaments 1.5–2.5 mm long. Anther sacs narrowly cylindrical, 0.5–0.8 mm long; connective wider than and projecting beyond anther sacs, apex of connective rounded with single large apical gland, up to 12 smaller oil glands between sacs. Staminal disk glabrous. Ovary apex glabrous. 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 1–11, 3.5–4.0 mm long, coat hard, bony. Embryo C-shaped; characters of emerging cotyledons remain unknown" (Kooyman 2005).

Uromyrtus australis can be distinguished from its congener *U. lamingtonensis* by having leaves mostly 7–20 mm wide, oil glands scattered; petals 4–5 mm long; fruit 5–9 mm diam. (*cf.* leaves mostly 3–7 mm wide, oil glands very dense; petals *c*. 2 mm long; fruit 4–5 mm diam. in *U. lamingtonensis*) (PlantNet 2024).

First described by Scott (1979) as *Uromyrtus australis*, synonyms include *Austromyrtus* sp. 2 J.B.Williams and *Austromyrtus* sp. nov. (Nightcap Range) (CHAH 2024).

Distribution and Abundance

Uromyrtus australis is endemic to New South Wales (NSW) (Commonwealth DCCEEW 2012) where it is restricted to the South Eastern Queensland bioregion 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 (AIATSIS 1996; Native Land Digital 2024).

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 (R. Kooyman *in litt.* September 2024) and no or very little seed is now produced due to myrtle rust (R. Kooyman *in litt.* January 2025). Given the species appears to persist in clonal populations that expand by vegetative spread via suckering (Kooyman 2005), effective gene flow between genets may have ceased and connectivity is probably based on physical spread. It is uncertain how many genets co-occur but, with *c.* 300 known genets, subpopulations could number in the hundreds.

The current distribution estimate is based on 341 unique and cleaned records compiled from NSW BioNet Atlas, Atlas of Living Australia, and herbarium specimens (ALA 2024; ANHSIR 2024; BioNet 2024; RBGDT 2024). Eighty-three records were excluded from the assessment: 56 records had inadequate data to spatially validate and 27 were of cultivated origins. The georeferences of three records were revised based on their descriptions.

Extent of occurrence and area of occupancy

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). 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). Both EOO and AOO were calculated using ArcGIS (Esri 2015).

Population size and trends

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 (*Austropuccinia psidii*), 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 monitoring 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 the species across its distribution (Kooyman 2024).

Ecology

Habitat

Uromyrtus australis occurs in warm temperate rainforest (simple notophyll vine forest) dominated by *Ceratopetalum apetalum* ± *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).

Co-occurring threatened species listed on the *Biodiversity Conservation Act 2016* include *Eidothea hardeniana*, *Corokia whiteana*, *Tinospora tinosporoides*, *Symplocos baeuerlenii*, *Niemeyera whitei*, *Hicksbeachia pinnatifolia*, *Hibbertia hexandra*, and *Elaeocarpus sedentarius* (NPWS 2003; DEC 2004).

Fire and disturbance ecology

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).

Uromyrtus australis 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).

Reproductive and seed ecology

Uromyrtus australis produces bisexual (hermaphroditic) flowers from November to December with fruit ripening from April to July (NPWS 2003). Flowering and fruiting are mostly restricted to the larger stems (>10–25cm diameter at breast height (DBH)) but small numbers of flowers and fruits are occasionally produced on smaller (5–10cm DBH) ramets (Kooyman 2005). Little is known about the pollinating agents of the species, but the open flower structure suggests insects, such as bees, flies and beetles, are likely pollinators (NPWS 2003).

Uromyrtus australis appears to persist in clonal populations that expand by vegetative spread via the production of suckers (Kooyman 2005). Despite producing large numbers of viable seeds (Kooyman 2005), no record of seedlings in the wild has ever been verified in over 40 years of monitoring (R. Kooyman *in litt.* September 2024). 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).

Uromyrtus australis does not appear to have a viable long-lived soil seed reserve, with viability limited to around 20 weeks (Kooyman 2005).

Lifespan and generation length

Large stems of *Uromyrtus australis* have been estimated to live for >1,500 years and have a reproductive lifespan of >1,000 years (Kooyman 2005). Due to the lack of effective sexual reproduction, the species is considered to be clonal (R. Kooyman *in litt.* January 2025), with suckering the only effective means of reproduction documented in the wild in over 40 years of monitoring (R. Kooyman *in litt.* September 2024). It is unclear at what age ramets begin to produce new ramets and therefore generation length is unknown.

Cultural significance

It is unknown whether *Uromyrtus australis* has cultural significance to Aboriginal peoples. This assessment is not intended to be comprehensive of the traditional ecological knowledge that exists for *Uromyrtus australis*, or to speak for Aboriginal people. Aboriginal people have a long history of biocultural knowledge, which comes from observing and being on Country, and evolves as it is tested, validated, and passed through generations (Woodward *et al*. 2020). Aboriginal peoples have cared for Country for tens of thousands of years (Bowler *et al*. 2003; Clarkson *et al*. 2017). There is traditional ecological knowledge for all plants, animals and fungi connected within the kinship system (Woodward *et al*. 2020).

Threats

Uromyrtus australis is threatened by myrtle rust, adverse fire regimes (particularly high frequency fire and high severity fire), and habitat disturbance from road maintenance. Historic forestry practices are likely to have adversely affected the species (R. Kooyman *in litt.* September 2024).

Myrtle rust (*Austropuccinia psidii*)

Myrtle rust was first detected on *Uromyrtus australis* in 2018–2019 following a long drought (NSW DCCEEW 2024) and has since then been identified as a serious threat to the species. Myrtle rust threatens numerous Australian rainforest species in the family Myrtaceae (Fensham and Radford-Smith 2021) and serious declines towards extinction are underway in some species (Carnegie *et al.* 2016; Makinson *et al.* 2020).

Since 2020, 40 fixed locations representing the distribution of *Uromyrtus australis* have been annually monitored for myrtle rust (NSW DCCEEW 2024). Monitoring has found that 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 *Uromyrtus 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 no individuals are resistant to infection.

'Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' is listed as a Key Threatening Process under the *Biodiversity Conservation Act 2016*.

Adverse fire regimes

Uromyrtus australis is threatened by adverse fire regimes, particularly high frequency fire and high severity fire. Fires in 2019–2020 resulted in approximately 30% of the species' 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 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 fire-impacted (burnt) following the 2019–2020 fires (DPE 2023). Detailed assessment of fire-impacts to ramets in three 20 x 30 m quadrats found high level of ramet mortality. In the two Nightcap 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 fire. However, the high mortality of ramets and loss of some genets indicates a low tolerance of fire, with survival likely to be lowest at high fire severity. Furthermore, repeated short interval fires can lead to depressed or failed resprouting in resprouting species (Karavani *et al.* 2018; Fairman *et al.* 2019).

The adverse effects of the 2019–2020 fires on the habitat of *Uromyrtus australis* were significantly exacerbated by historic logging that included clear-felling and conversion of rainforest areas to eucalypt forest (Kooyman 2024). Historic logging has disrupted the natural topographic-wetness patterns in the landscape that protected the core-moist refugia habitat of *U. australis* (R. Kooyman *in litt.* September 2024). While logging no longer occurs, considerable areas within and adjacent to the species' habitat and natural distribution were variously cleared and adversely affected by forestry operations to expand the extent of commercial eucalypt species (R. Kooyman *in litt.* September 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 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).

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.

'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', is listed as a Key Threatening Processes under the *Biodiversity Conservation Act 2016*. 'Fire regimes that cause declines in biodiversity' is listed as a Key Threatening Processes under the *Environment Protection and Biodiversity Conservation Act 1999*.

Habitat disturbance from road maintenance

Road maintenance activities, such as slashing, have been noted to have minor adverse effects on *Uromyrtus australis* at several sites (Kooyman 2005). Minor adverse effects from road maintenance and track construction were recorded in relation to machinery use in the 2023–2024 survey period (Kooyman 2024).

'Clearing of native vegetation' is listed as a Key Threatening Process under the NSW *Biodiversity Conservation Act 2016*. 'Land clearance' is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Number of locations and severe fragmentation

Uromyrtus australis occurs at one threat-defined location as per the IUCN (2024) definition. This is due to 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 wind-dispersed (Westaway 2016). Consequently, there is a single threat-defined location under the threat of myrtle rust.

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 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 due to reproduction being limited to vegetative spread via suckering. Given *Uromyrtus australis* grows very slowly (Kooyman 2005), once a subpopulation is lost, it is unlikely to be recolonised. 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 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.

Assessment against IUCN Red List criteria

For this assessment it is considered that the survey of *Uromyrtus australis* has been adequate and there is sufficient scientific evidence to support the listing outcome.

Criterion A *Population size reduction*

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 where the causes of the reduction are clearly reversible AND understood AND have ceased.

A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction projected, inferred 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 (AOO), extent of occurrence (EOO) and/or habitat quality

(d) actual or potential levels of exploitation

(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

Outcome

Uromyrtus australis is Data Deficient under Criterion A.

Population reductions

Approximately ~10% of the adult population was lost or severely affected by the 2019–2020 fires (R. Kooyman *in litt.* September 2024). In additional, 80% of genets are affected by myrtle rust (R. Kooyman *in litt.* September 2024) with ~10% of the remaining genets currently on the brink of being lost or in serious decline (R. Kooyman *in litt.* December 2024).

Conclusion

Uromyrtus australis is Data Deficient under Criterion A as the generation length is not known. Consequently, it is not possible to quantify decline over a three-generation timeframe.

Criterion B *Geographic range*

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
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			

Outcome

Uromyrtus australis is Critically Endangered under Criterion B1ab(iii,v).

EOO and AOO

The extent of occurrence (EOO) has been calculated at 89 km^2 and the area of occupancy (AOO) has been calculated at 88 km^2.

Number of threat-defined locations

Uromyrtus australis is found at one threat-defined location when considering the most serious plausible threat of myrtle rust.

Severely fragmented

Uromyrtus australis is inferred to be severely fragmented.

Continuing decline

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.

Extreme fluctuations

There is no evidence to suggest *Uromyrtus australis* undergoes extreme fluctuations and as a long-lived tree, it is unlikely to.

Conclusion

Uromyrtus australis is eligible to be listed as Critically Endangered as it has a very highly restricted geographic distribution (an EOO of 89 km^2), occurs in one threat-defined location, and is undergoing continuing decline in the number of mature individuals and the area, extent, and quality of habitat.

Criterion C Small population size and decline

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 at 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				

Outcome

Uromyrtus australis is Vulnerable under Criterion C1.

Number of mature individuals

Prior to the first observed infections of *Uromyrtus australis* by myrtle rust (*Austropuccinia psidii*) in 2018, it was estimated that there was around 10,000 stems (ramets) present (R. Kooyman *in litt.* December 2024). It is unknown what the number of ramets currently is but monitoring in 2024 counted 3,286 in monitoring plots (R. Kooyman *in litt.* September 2024). Based on the information currently available, it is likely that the current number of ramets is >3,500 but <10,000.

Continuing decline

There has been a *c.* 10% decline in the number of mature individuals within the last 10 years due to the adverse effects of fire, meeting the threshold for Vulnerable under Criterion C1.

Mature individuals in each subpopulation

There is uncertainty around the number of subpopulations of *Uromyrtus australis* . Consequently, it is not possible the estimate the number of mature individuals in each subpopulation.

% of mature individuals in a single subpopulation

Given the uncertainty around the number of subpopulation that *Uromyrtus australis* occurs in, it is not possible to estimate the proportion of mature individuals in each subpopulation.

Extreme fluctuations

There is no evidence to suggest *Uromyrtus australis* undergoes extreme fluctuations and as a long-lived tree, it is unlikely to.

Conclusion

Uromyrtus australis is eligible to be listed as Vulnerable as there are >2,500 mature individuals (ramets) but likely to be <10,000, there has been a *c.* 10% decline in the number of mature individuals within the last 10 years due to the effects of fire, and all individuals occur in a single subpopulation.

Criterion D Very small or restricted population

D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 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 taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km^2 or number of locations ≤ 5

Outcome

Uromyrtus australis is ineligible to be listed under Criterion D.

Number of mature individuals

The current population size of *Uromyrtus australis* is not known precisely, but there are known to be >2,500 and likely to be <10,000 ramets.

Risk of future extinction in a very short amount of time (D2)

Uromyrtus australis occurs at one threat-defined location and has an estimated AOO of 88 km^2. There are no plausible future threats that could rapidly drive the species to Extinct in a very short time.

Criterion E Quantitative Analysis

E. Quantitative Analysis	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Outcome

Uromyrtus australis is considered Data Deficient under Criterion E.

Probability of extinction

Kooyman (2005) undertook a population viability analysis (PVA) inclusive of large ramet stem projection models relative to clonal persistence and fecundity and found that the population size of *Uromyrtus australis* was stable. However, a revised PVA is required to factor in recent events, including the *c.*10% loss of mature adults in the 2019–2020 fires and the ongoing adverse effects of myrtle rust since first detected on the species in 2018–2019 (including high ramet stem mortality and failure to fruit) (R. Kooyman *in litt.* September 2024).

Conservation and Management Actions

Uromyrtus australis is currently listed on the NSW *Biodiversity Conservation Act 2016* and a conservation project has been developed by the NSW Department of Planning and Environment under the Saving our Species program. The conservation project identifies priority locations, critical threats and required management actions to ensure the species is extant in the wild in 100 years. *Uromyrtus australis* sits within the 'site-managed species' management stream of the SoS program and the conservation project can be currently accessed here: https://savingourspecies.environment.nsw.gov.au/project/89.

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Expert Communications

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APPENDIX 1

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 Clause 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.