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Notice 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 *Rhodamnia maideniana* C.T. White as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

The NSW Threatened Species Scientific Committee is satisfied that *Rhodamnia maideniana* C.T. White has been duly assessed by the Queensland Species Technical Committee under the Common Assessment Method (Collingwood 2020). The acceptance of this assessment is provided for by Part 4.14 of the Act.

Summary of Conservation Assessment

Rhodamnia maideniana was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: clause 4.2 1(a), 2(e). The main reason for this species being eligible is it has experienced a very large reduction in population size due to the effects of the pathogen Myrtle Rust.

The NSW Threatened Species Scientific Committee has found that:

1. *Rhodamnia maideniana* C.T. White (Myrtaceae) is a bushy shrub, commonly 1.5–3 m high, with reddish brown fibrous-flaky bark; young shoots sparsely pubescent, glabrescent. Leaves with lamina ovate to narrow-elliptic, 5–10 cm long, 2–4.5 cm wide, apex long-acuminate with a rounded tip, base cuneate, both surfaces ± glabrous; strongly 3-veined from base, lateral veins numerous, not transverse; oil glands numerous and distinct; petiole 5–6 mm long. Inflorescences 2–4 per axil, each 1–3-flowered; peduncles 1–3 mm long. Hypanthium ± glabrous. Sepals 1 mm long, persistent, pink. Petals 3–4 mm long, white. Stamens c. 4 mm long. Style 4 mm long. Berry globose, 8–12 mm diam., black (PlantNET accessed 7 September, 2021).

2. *Rhodamnia maideniana* is known from a sub-coastal distribution, with a narrow range from the Springbrook region in Queensland, to the west of Ballina in New South Wales, in the South East Queensland bioregion. The species occurs in several national parks that are managed for conservation, including Lamington National Park, Springbrook National Park, Mooball National Park and Wollumbin National Park (Queensland Government 2019). The species also occurs in Currumbin Hill Conservation Park. In NSW, there have only been a few recent observations on private property in the Burringbar Range area and near Mt Warning. Earlier records suggest it was once near Alstonville on agricultural land but there are no recent records in this southern area.

3. '*Rhodamnia maideniana* occurs in subtropical rainforest on basaltic soils, including red-brown loams and clay loams. It can be locally common on slopes and in gullies, growing from 40 – 900 m above sea level (Snow 2007). It often occurs in disturbed fragments and along edges of simple to complex notophyll vineforest, in the ecotone with adjacent wet eucalypt forest. Flowering occurs from November to March, with fruiting throughout the year' (Collingwood 2020).

4. The ecology of *Rhodamnia maideniana* is poorly known with no information on the genetics, reproductive biology, dispersal, recruitment or population structure of the species (Collingwood 2020). The age to first reproduction is estimated as 4-5 years under ideal conditions (P. Forster, pers. comm. 2020). Longevity is not known, but is likely to be at least 50 years. Therefore, the generation length can be estimated to be at least 22.5 years (Collingwood 2020).

5. *Rhodamnia maideniana* has a highly restricted geographic distribution. Using verified herbarium records, the extent of occurrence (EOO) is estimated to be 3945 km^2 (Collingwood 2020), based on a minimum convex polygon enclosing the mapped occurrences of the species, the method of assessment recommended by IUCN (2019). The area of occupancy (AOO) is 208 km^2, based on 2 km x 2 km grid cells, the spatial scale of assessment recommended by IUCN (2019). It is likely that the EOO and AOO are considerably smaller as the majority of individuals across the range of the species are no longer reproductively viable (Collingwood 2020) and therefore can no longer be considered as viable subpopulations. Survey data indicates a continual, observed decline in the EOO, AOO, area/extent/quality of habitat, number of locations/subpopulations and number of mature individuals (Collingwood 2020).

6. *Rhodamnia maideniana* is highly susceptible to the myrtle rust pathogen *Austropuccinia psidii* (Pegg et al. 2014)). Surveys across the northern distribution of the species indicate that >95% of individuals are severely impacted by myrtle rust (*Puccinia psidii*) (J. Radford-Smith, pers. comm. 2019). Similarly, direct observations indicate that >95% of flowers do not produce fruit due to myrtle rust infection (L. Weber, pers. comm. 2019). Remaining individuals are highly unlikely to produce offspring now or in the future due to infection of flowers and fruit. The species occurs at a single location when assessed against the threat of myrtle rust that occurs across the entire range of the species. 'Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' is a Key Threatening Process in the Act.

7. *Rhodamnia maideniana* C.T. White 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:

Appendix 1

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

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Critically endangered under Clause 4.2 1(a), 2(e).

(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: Data deficient.

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: Vulnerable under Clause 4.7.

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.

Dr Anne Kerle
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

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Pegg, G. S., Giblin, F. R., McTaggart, A. R., Guymer, G. P., Taylor, H., Ireland, K. B., Shivas, R. G., and Perry, S. (2014). *Puccinia psidii* in Queensland, Australia: disease symptoms, distribution and impact. *Plant Pathology* **63**, 1005-1021.

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