

# NSW Threatened Species Scientific Committee

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Exhibition period: 30/11/18 – 25/01/19

Proposed Listing date: 30/11/18

## 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 shrub *Homoranthus bebo* L.M.Copel. 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.

### Summary of Conservation Assessment

*Homoranthus bebo* is eligible for listing as Critically endangered, as the highest threat category met by the taxon across all categories, under Clause 4.3(a) (d) (e i) because: i) the distribution of the species is very highly restricted with an area of occupancy of 4 km<sup>2</sup> and an extent of occurrence of 4 km<sup>2</sup>; ii) the species is only known to occur at a single location; and iii) there is a continuing decline in the abundance of the species.

The NSW Threatened Species Scientific Committee has found that:

1. *Homoranthus bebo* L.M.Copel. (family Myrtaceae) was described by Copeland *et al.* (2011) as a “Decumbent shrub, 0.05–0.2 m tall, 0.5–2 m wide, producing adventitious roots on prostrate branches, glabrous. Leaves opposite, decussate, punctate, aromatic, 3–7 mm long, 0.2–0.5 mm wide, 0.5–0.8 mm thick, linear, mucronate, shortly petiolate, shiny, lime-green; blade in side view straight to incurved linear; petiole 0.5–0.8 mm long, slightly glaucous. Flowering branchlets undifferentiated, with 3–10 flowers held erect in leaf axils towards branchlet apex. Inflorescence a monad; peduncles 0.7–1.7 mm long; bracteoles caducous, 2.0–3.5 mm long, pale purple. Hypanthium cylindrical, 5-costate, smooth between the ribs, glabrous, 2.0–3.3 mm long, pale yellow–green. Sepals 5, 1.0–2.2 mm long, yellow, the margin entire, the apex long acuminate. Petals 5, yellow, broadly obovate, the apex obtuse, 0.5–1.2 mm long, the margin entire. Stamens 10; filaments ~0.4 mm long; anthers globose, basifixed, yellow-brown. Staminodes 10, alternating with the stamens, distinctly adnate to the adjacent antepetalous stamen. Style 6–9 mm long, exceeding the hypanthium by 3–5 mm at anthesis, minutely hirsute below the papillose stigma, yellow. Ovary unilocular; placenta sessile, axile-basal, bearing 8–10 ovules. Fruit a dry, indehiscent nut, brown.”
2. *Homoranthus bebo* is endemic to New South Wales and currently only known from a single population occurring on the northern edge of Dthinna Dthinnawan Nature Reserve, c. 20 km north-west of Yetman, near the Queensland border (Copeland *et al.* 2011; PlantNET 2017). The population occupies an area of c. 9.3 ha (Hunter 2016). Much of the area surrounding the Reserve has been extensively cleared for grazing. While there is c. 5237 ha of potentially suitable habitat within the Nature Reserve and adjacent Dthinna Dthinnawan National Park, no further individuals have been located (Hunter 2008, 2016).
3. *Homoranthus bebo* occurs on deep sandy soils over sandstone and is associated with Smooth Barked Apple/Black Cypress Woodland (Copeland *et al.* 2011; Hunter 2016). The species is killed by fire and is believed to be an obligate seeder which regenerates from persistent soil stored seed banks, however post-fire seedling recruitment has not been observed (Hunter 2016). *Homoranthus bebo* may propagate vegetatively by rooting at

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nodes along branches (Hunter 2016) as observed in other *Homoranthus* and *Darwinia* species (Briggs 1962; Copeland *et al.* 2011).

4. The geographic distribution of *Homoranthus bebo* is very highly restricted. The extent of occurrence (EOO) and area of occupancy (AOO) are both estimated to be 4 km<sup>2</sup>. The extent of occurrence (EOO) was based on a minimum convex polygon encompassing all known locations, the method for assessing EOO recommended by IUCN (2016). The area of occupancy is based on one 2 x 2 km grid cell, the scale recommended for assessing AOO by IUCN (2016).
5. The number of mature individuals of *Homoranthus bebo* is difficult to determine as it is believed the species primarily undergoes vegetative reproduction and forms dense clumps. However, estimates based on counts of independent clumps place the number of mature individuals to be between 10,000 and 20,000 (Hunter 2016).
6. Inappropriate fire regimes are a significant threat to *Homoranthus bebo*. Recent hazard reduction burns reduced the area occupied by the species by approximately 34%, with an estimated population reduction of 33% (Hunter 2016). In these burns the aboveground plant parts were killed, and there was no evidence of post-fire seedling recruitment after 12 months (Hunter 2016). Based on the small area occupied by *H. bebo* and its observed lack of recruitment post-fire, the species there is an extremely high risk of extinction after even a single moderate severity fire. '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 Act.
7. Other current threats to *Homoranthus bebo* include grazing by livestock and feral animals including goats (*Capra hircus*), pigs (*Sus scrofa*) and rabbits (*Oryctolagus cuniculus*), potential competition with a number of weed species found in Dthinna Dthinnawan Nature Reserve including Coolatai Grass (*Hyparrhenia hirta*), Mother-of-millions (*Bryophyllum delagoense*), Cat's claw creeper (*Dolichandra unguis-cati*), various prickly pear species (*Opuntia* spp.) and Whisky Grass (*Andropogon virginicus*), and disturbance from nearby road or fence maintenance activities (OEH 2014). 'Clearing of native vegetation', 'Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)', 'Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758', 'Invasion of native plant communities by exotic perennial grasses', 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants', and 'Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758' are listed as Key Threatening Processes under the Act.
8. *Homoranthus bebo* L.M.Copel. 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*:

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

<b>(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:</b>			
	(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.
<b>(2) - The determination of that criteria is to be based on any of the following:</b>			
	(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 via Clause 4.3(a) (d) (e i)

<b>The geographic distribution of the species is:</b>			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted.
<b>and at least 2 of the following 3 conditions apply:</b>			
	(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.

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Clause 4.4 - Low numbers of mature individuals of species and other conditions  
 (Equivalent to IUCN criterion Clause C)  
 Assessment Outcome: Not met

<b>The estimated total number of mature individuals of the species is:</b>			
	(a)	for critically endangered species	very low, or
	(b)	for endangered species	low, or
	(c)	for vulnerable species	moderately low.
<b>and either of the following 2 conditions apply:</b>			
	(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

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

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

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

Clause 4.7 - Very highly restricted geographic distribution of species—vulnerable species  
(Equivalent to IUCN criterion D2)  
Assessment outcome: Vulnerable

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.
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Dr Marco Duretto  
Chairperson  
NSW Threatened Species Scientific Committee

## References:

- Briggs BG (1962) The New South Wales species of *Darwinia*. *Contributions from the New South Wales National Herbarium* **3**, 129–150.
- Copeland LM, Craven LA, Bruhl JJ (2011) A taxonomic review of *Homoranthus* (Myrtaceae: Chamelaucieae). *Australian Systematic Botany* **24**, 351–374.
- Hunter JT (2008) Vegetation and Floristics of Dthinia Dthinnawan Nature Reserve. Unpublished report for the New South Wales National Parks and Wildlife Service. [ResearchGate. DOI: 10.13140/RG.2.1.4540.2723]
- Hunter JT (2016) Mapping of *Homoranthus bebo* L.M.Copel. Unpublished report for Tenterfield District OEH, NPWS. [ResearchGate. DOI: 10.13140/RG.2.2.26016.17922]
- IUCN Standards and Petitions Subcommittee (2016) Guidelines for Using the IUCN Red List Categories and Criteria. Version 12. Prepared by the Standards and Petitions Subcommittee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>

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OEH (NSW of the Environment and Heritage) (2014) Statement of Management Intent: Dthinna Dthinnawan Nature Reserve and Dthinna Dthinnawan National Park. OEH (NSW), Goulburn Street, Sydney, NSW 1232.

PlantNET (The NSW Plant Information Network System) Royal Botanic Gardens and Domain Trust, Sydney. <http://plantnet.rbgsyd.nsw.gov.au> (accessed 21 August 2017).