

Amended on 09/11/2023.

Minor change: The 25/8/23 notice and reasons for determination incorrectly stated that the species was provisionally listed as Endangered. This species was provisionally listed as critically endangered.

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 *Fontainea* sp. Coffs Harbour (A.S.Benwell 341, NSW1102027) 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

Fontainea sp. Coffs Harbour (A.S.Benwell 341, NSW1102027) was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.2(1a)(2bc); Clause 4.3(a)(d)(e,i,iii); Clause 4.4(a)(d i)(e i,ii,A(l)B); and Clause 4.5(a). The main reasons for this species being eligible are: i) it has a very highly restricted geographical range; ii) the estimated total number of mature individuals is extremely low; iii) it is only found at a single threat defined location; iv) it is severely fragmented; (v) it is likely to undergo a very large reduction in population size; and (vi) there is continuing decline in habitat area, extent or quality and number of mature individuals due to clearing and habitat disturbance from imminent road construction works.

The NSW Threatened Species Scientific Committee has found that:

1. *Fontainea* is a genus of rainforest trees in the Euphorbiaceae family. Nine species are known globally, of which six occur in Australia, in Queensland and New South Wales (ALA accessed September 2022). Two species of *Fontainea* that currently occur in NSW (Jessup and Guymer 1985) are: *F. oraria*, listed as a Critically Endangered species on the BC Act, which occurs near Lennox Head on the NSW far north coast; and *F. australis*, listed as a Vulnerable species on the BC Act, which occurs on the NSW far north coast/hinterland and in Queensland.
2. *Fontainea* sp. Coffs Harbour (A.S.Benwell 341, NSW1102027) (to be referred to throughout this document as '*Fontainea* sp. Coffs Harbour'), is a species recently described following a survey in the Coffs Harbour area in January 2021 (TfNSW 2022). *Fontainea* sp. Coffs Harbour was recognised as a distinct species by Guymer (*in litt.* August 2021) and this is reflected in PlantNET (accessed August 2022) and the Australian Plant Name Index (accessed August 2022). Genetic work has confirmed *Fontainea* sp. Coffs Harbour to be a distinct species (Ogbourne *et al.* 2021).
3. *Fontainea* sp. Coffs Harbour is described in PlantNET (2022) as a "small tree to 5 m high; bark grey, smooth to slightly rugose. Leaves with lamina elliptic to ovate, leaves (4-)6–9(-13) cm long, (2-)3–4(-6) cm wide, glabrous, upper surface dark green, lower surface paler; glands submarginal, 2–3 mm above base of lamina; petiole 5–15(-25) mm long, with slightly swollen joint at apex, and slightly swollen at the base. Inflorescence [sic] terminal or subterminal, a

NSW Threatened Species Scientific Committee

raceme of 3 flowers or reduced to solitary flower. Flowers unisexual, unclear whether plants are monoecious or dioecious [sic]. Female floral axes 3–8 mm long. Female flower actinomorphic, 10–15 mm diameter, petals white, styles yellow, radiating from apex of ovary. Male floral axes 3–7 mm long, male flower actinomorphic, 10–15 mm diameter; stamens 20–25, erect in central cluster, basally connate. Fruit ellipsoidal, pink-orange, 25–30 mm long, 16–24 mm diameter, the intersutural surface of the endocarp markedly rugose.” (PlantNET accessed August 2022).

4. *Fontainea* sp. Coffs Harbour is thought to be most similar to *F. oraria*. The main feature that distinguishes *F.* sp. Coffs Harbour from *F. oraria* and other known *Fontainea* species is the unique endocarp of the fruit (Guymer *in litt.* August 2021). The endocarps of *F.* sp. Coffs Harbour are “ellipsoidal, about twice as long as wide, 24-28 mm long, 13-15 mm wide, apex acute; intersutural faces markedly rugose; fruits ellipsoidal, pink-orange, 25-30 mm long, 16-24 mm diameter.” (Guymer *in litt.* August 2021). The endocarps of *F. oraria* are “globose about as long as wide, 15-18 mm long, 14-16 mm wide, apex obtuse; intersutural faces slightly rugose and grooved; fruits globular or depressed-globular, shallowly 3 or 6-lobed, pink to red, 18-22 mm long, 22-24 mm diameter.” (Guymer *in litt.* August 2021).
5. *Fontainea* sp. Coffs Harbour is presently known from only two sites near Coffs Harbour on the NSW mid-north coast. The sites occur in two separate fragments of Brush Box-rainforest (Ecos Environmental 2022). This vegetation type is uncommon in the Coffs Harbour area occurring in a narrow zone along drainage lines and gullies (Ecos Environmental 2022). The vegetation community is dominated by mature *Lophostemon confertus* (Brush Box), 30-40 m high with occasional *Eucalyptus microcorys* (Tallowwood), *Corymbia intermedia* (Pink Bloodwood), *E. pilularis* (Blackbutt) and *E. grandis* (Flooded Gum) over a 5-15 m high rainforest understorey of small to medium sized trees, including *Dysoxylum mollissimum* (Red Bean), *Cryptocarya microneura* (Murrogun), *Cryptocarya rigida* (Forest Maple), *Elaeocarpus reticulatus* (Blue-berry Ash), *Endiandra discolor* (Domatia Tree), *Synoum glandulosum* (Scentless Rosewood), *Niemeyera whitei* (Rusty Plum), *Archontophoenix cunninghamiana* (Bangalow Palm) and *Ficus watkinsiana* (Strangling Fig), plus many vines, herbs and ferns (Ecos Environmental 2022). *Fontainea* sp. Coffs Harbour may occur in other topographies and vegetation communities.
6. The geographic distribution of *Fontainea* sp. Coffs Harbour is very highly restricted. The extent of occurrence (EOO) and the area of occupancy (AOO) are both 4 km². The AOO is based on the species' occupying a single 2 km x 2 km grid cell, the spatial scale of assessment recommended by IUCN (2022). The EOO was measured by a minimum convex polygon containing all the known sites of occurrence. When EOO is less than AOO, IUCN (2022) recommend EOO estimates be adjusted to be equal to AOO to ensure consistency with the definition of AOO as an area within EOO.
7. There is an extremely low number (fewer than ten) of mature individuals of *Fontainea* sp. Coffs Harbour currently known. They occur on land owned by Transport for NSW (TfNSW) and within the project boundary of the Coffs Harbour bypass road construction project (TfNSW 2022). There are no known occurrences of the species in conservation reserves. Surveys were carried out to determine if *Fontainea* sp. Coffs Harbour occurs in areas of similar habitat around and within the bypass corridor, but no other occurrences have been found (TfNSW 2022).

NSW Threatened Species Scientific Committee

8. *Fontainea* sp. Coffs Harbour is in immediate threat from clearing and road construction works. The sites have been disturbed in the past by proximity to cleared land, grazing and trampling from domestic stock and feral deer.
9. The two sites where *Fontainea* sp. Coffs Harbour occurs are within the project boundary of the approved highway bypass at Coffs Harbour. One site will be cleared as part of the road construction project (TfNSW 2022). This will lead to the loss of all *Fontainea* sp. Coffs Harbour plants and their habitat at this site. There is a plan to translocate *F. sp. Coffs Harbour* plants from this site to a new site nearby (TfNSW 2022). Plants of *F. sp. Coffs Harbour* occurring in the other site will be retained *in-situ*, however, some surrounding habitat will be cleared. The remaining plants at this site will be in close proximity to cleared areas and road construction activities, with associated risks to the plants and their habitat. Clearing of the adjacent vegetation may lead to changes in the micro-climatic conditions of the site. The edges of remnant bush that are exposed are at an increased risk of weed invasion reducing the suitability of the habitat. These changes will likely lead to reduced plant health, reduced reproduction and/or individual tree survival and reduced establishment and survival of seedlings and juvenile plants of *F. sp. Coffs Harbour* (TfNSW 2022). A management plan has been developed for the site (TfNSW 2022). 'Clearing of native vegetation' is listed as a Key Threatening Process under the Act
10. Feral deer (family Cervidae) are present in the area and there is evidence of disturbance to co-occurring species at one of the *Fontainea* sp. Coffs Harbour sites. Feral deer may kill or damage seedlings and saplings by their browsing activities, which in some cases includes stripping bark from trunks, reducing plant vigour, promoting disease entry, or even ring-barking stems. Pest fauna movement may increase due to the road construction project facilitated by the introduction of cleared areas adjacent to the new highway (TfNSW 2022). Feral deer may potentially introduce and/or spread pathogens and disease (TfNSW 2022). 'Herbivory and environmental degradation caused by feral deer' is listed as a Key Threatening Process under the Act.
11. *Fontainea* sp. Coffs Harbour (A.S.Benwell 341, NSW1102027) 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*:

NSW Threatened Species Scientific Committee

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome: Critically Endangered under Clause 4.2(1a)(2bc), Clause 4.3(a)(d)(e i,iii), Clause 4.4(a)(d i)(e i,ii A(I)B) and Clause 4.5(a).

Clause 4.2 – Reduction in population size of species

(Equivalent to IUCN criterion A)

Assessment Outcome: Critically Endangered under Clause 4.2(1a)(2bc).

(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.	

NSW Threatened Species Scientific Committee

Clause 4.4 – Low numbers of mature individuals of species and other conditions (Equivalent to IUCN criterion Clause C)

Assessment Outcome: Critically Endangered under Clause 4.4(a)(d i)(e i,iiA(I)B).

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: Critically Endangered under Clause 4.5(a).

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.

NSW Threatened Species Scientific Committee

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.
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Senior Professor Kristine French
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Scott J (2023) Conservation Assessment of *Fontainea* sp. Coffs Harbour (A.S.Benwell 341, NSW1102027) (Euphorbiaceae). NSW Threatened Species Scientific Committee.

References

APNI (accessed August 2022) Australian Plant Name Index. Centre for Australian National Biodiversity Research, Canberra. Accessed at:

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Ecos Environmental Pty Ltd (2022) Coffs Harbour Bypass: Targeted Surveys 1-3 for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour. Confidential unpublished report prepared for Transport for New South Wales.

IUCN Standards and Petitions Subcommittee (2022) Guidelines for Using the IUCN Red List Categories and Criteria. Version 15.1 Available at:

<https://www.iucnredlist.org/resources/redlistguidelines>

Jessup LW & Guymer GP (1985) A revision of *Fontainea* Heckel (Euphorbiaceae – Clutyeae). *Austrobaileya* 2(2): 112–125.

Ogbourne S, Conroy G and Brunton A. (2021) Genetic analysis of *Fontainea* sp. Coffs Harbour Report Version: Final v1. Confidential unpublished report by the University of the Sunshine Coast, Queensland, Australia for Transport for NSW. (currently unavailable for access by public online).

NSW Threatened Species Scientific Committee

PlantNET (2022) (The NSW Plant Information Network System) Royal Botanic Gardens and Domain Trust, Sydney. (accessed August 2022). Species page for *Fontainea* sp. Coffs Harbour. Available at [https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Fontainea~sp.+Coffs+Harbour+\(A.S.Benwell+341,+NSW1102027\)](https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Fontainea~sp.+Coffs+Harbour+(A.S.Benwell+341,+NSW1102027))

Transport for New South Wales (2022) Coffs Harbour Bypass *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan. Final 26 October 2022. Confidential Document – not for public release.

A notice of determination to provisionally list this species as a critically endangered species was published on 15/10/2021