Notice of the Determination for provisional listing of a critically endangered species on an emergency basis

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Determination for provisional listing, on an emergency basis, of the species, *Pittosporum* sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act.

What happens next?

This species will be provisionally listed as critically endangered species when the provisional listing determination is published on the New South Wales legislation website www.legislation.nsw.gov.au.

In the near future the Committee will make a preliminary determination regarding this proposal which will be placed on public exhibition. Public submissions will be invited at that time.

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NSW Threatened Species Scientific Committee

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Determination for provisional listing of a Critically endangered species on an emergency basis

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Determination for provisional listing, on an emergency basis, of the species, *Pittosporum* sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act. Provisional Listing of Critically Endangered species on an emergency basis is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Pittosporum sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) was found to be Critically Endangered in accordance with the following provision in the *Biodiversity Conservation Regulation 2017*: clause 4.4(a), (d,(i)), (e(i),(ii, (B). The main reasons for this species being eligible are: i) the estimated total number of mature individuals is very low; and (ii) there is projected continuing decline as the species is threatened by road construction works.

The NSW Threatened Species Scientific Committee has found that:

1. *Pittosporum* sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) is a recently discovered species in the Coffs Harbour area of the New South Wales mid-north coast. The species has been recognised as distinct from other known *Pittosporum* species (Makinson *in litt.* October 2021; PlantNET accessed October 2021; Cayzer *in litt.* November 2021) and is referred to as *Pittosporum* sp. Coffs Harbour (A.S.Benwell 342, NSW1102028). A genomic study has also supported *Pittosporum* sp. Coffs Harbour as a new species (RCfER 2021).

2. Makinson (*in litt.* October 2021) has provided a preliminary diagnosis and description of *Pittosporum* sp. Coffs Harbour from his observations of limited specimen material and images. It should be noted that only male (or hermaphrodite) flowers were available for the following description and if there are distinct female flowers their shape needs to be checked. Further detailed work is required before a formal description is available. *Pittosporum* sp. Coffs Harbour is provisionally described as a “single-stemmed subshrub to c. 1.2 m tall, arising from shallow, horizontal rhizomes averaging 5 mm in diameter; ramets often gregarious and forming a low thicket. Branches few, short, ascending, stems sometimes with knobbly leaf scars; branching bi- or trifurcate; new shoots with a cluster of multiple cupular bracts at the base, these persisting as shoot elongates. Short spinescent lateral shoots entirely lacking (cf. *P. lancifolium*). Indumentum largely confined to young branchlets, very young petioles, and pedicels, made up of loosely wavy or twisted hairs, slightly ginger-ferruginous, forming a weak loose openly tomentose-villous indumentum; leaves otherwise glabrous. Outer surface of sepals with occasional isolated hairs. Adult leaves alternate, mostly in pseudo-whorls of 4 or 5 leaves, with one or more often

reduced to a much smaller size. Petioles 2–5 mm long, villous-tomentose (the hairs soon caducous).

"Leaf lamina glabrous, broadly oblanceolate (almost obtrullate) or occasionally broadly elliptical-lanceolate; lamina of apparently mature leaves 70-100 mm long, 19-28 mm wide, markedly discolorous when fresh (very dark green above, mid-green below), the contrast less marked when dried; midvein pale on both surfaces, impressed on upper surface, prominent on lower surface; lateral veins evident on both surfaces; reticulum faint but distinct. Margins very slightly and shortly recurved, without any evident undulation. Leaf base narrowly cuneate, decurrent to petiole. Leaves not aromatic when crushed.

"Inflorescences 2–4-flowered. Configuration not yet determined: either terminal 2–4-flowered umbels with 1 or 2 conspicuous caducous(?) narrowly lanceolate bracteoles and 1–3 subtending (or interrupting?) leaves or leaf-like bracteoles, or alternatively very condensed 1- or 2-flowered axillary (solitary or two such together) with intervening leaves. Flower buds erect, fusiform. Flowers not fragrant, odourless. Pedicels 2–3 mm long, shortly villous-tomentose. Pedicellar bracts not evident on material seen. Sepals 3–6 mm long, narrowly and attenuatedly lanceolate, sparsely hairy on outer surface; sepals becoming widely ascending in late bud stage and on some flowers becoming widely spreading at or after flower opening. Corolla salverform, the petals connate in a narrow, straight-sided trumpet-like tube (gradually widening from base for 6–7 mm, becoming 2–3 mm wide just below petal separation), then the apical c. 2 mm of the petals abruptly separating and spreading to recurved. Petals 8–10 mm long, c. 1–1.5 mm wide. Anthers erect, basifixed, c. 2 mm long.

"Fruits held erect; pedicels elongating to c. 7 mm as fruit matures; fruit a subglobose capsule, becoming dull yellow-orange before opening, 4-grooved, two-valved, c. 9 mm (to 12 mm), 2-4-seeded, the valves separating widely, eventually deflexed almost to the pedicel and becoming almost flat and plate-like, the seeds presented against inner surface of valves which are bright enamel yellow when fresh (light orange when dry) contrasting with the red fleshy seeds. Seeds reniform, glossy, bright red-orange, surrounded by a red pulp." (Makinson *in litt.* October 2021).

3. Two other *Pittosporum* species (*P. undulatum* and *P. revolutum*) grow in the same general area as *P.* sp. Coffs Harbour. Another *Pittosporum* species (*P. lancifolium*) occurs on the far north coast near Lismore and early consideration was given to the Coffs Harbour entity as being a juvenile or neotenic form of that taxon; this view has not been sustained in the light of additional material (Makinson pers comm. November 2021). The main features that distinguish *Pittosporum* sp. Coffs Harbour from these three other *Pittosporum* species include: its habit as a low erect shrub producing prolific ramets from rhizomes (cf. tall shrub to sizeable trees in *P. undulatum* and *P. lancifolium*; or shrub or small tree 1–4 m tall for *P. revolutum*); inflorescences 2–4-flowered, unbranched (cf. 6–35-flowered and very often branched (compound umbels) in *P. undulatum*; cf. 4–16?-flowered in *P. revolutum*, sometimes branched (compound); cf. 1– or rarely 2–flowered and unbranched/non-compound in *P. lancifolium*); fruit dull

orange at maturity (cf. black in *P. lancifolium*), and containing only two(-4) seeds (cf. 12–14 in *P. lancifolium*; 'numerous' in *P. undulatum*; 20–78 in *P. revolutum*); and a lack of foliar aromaticity and floral fragrance (Makinson *in litt.* October 2021).

4. *Pittosporum* sp. Coffs Harbour is endemic to New South Wales and occurs in a small area just north of Coffs Harbour at four sites associated with wet sclerophyll-rainforest in sheltered areas, including lower, south-facing slopes, along drainage lines and in gullies, generally within 5 km of the ocean (Anon. *in litt.* October 2021). The largest site where *Pittosporum* sp. Coffs Harbour occurs is in forest 30-40 m high and dominated by *Lophostemon confertus* (Brush Box), with *Eucalyptus grandis* (Flooded Gum), *E. microcorys* (Tallowwood), *Corymbia intermedia* (Pink Bloodwood) and *E. pilularis* (Blackbutt) subdominant. The forest mid-stratum consists of rainforest trees 5-15 m high, 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), *Ficus watkinsiana* (Strangling Fig) and other tree species, as well as shrubs, vines, herbs and ground ferns. Exotic species such as *Hypoestes phyllostachya* (Polka-dot-plant) may be present. The soil is a red-yellow clay podzol formed on metasediment. A few plants of *Pittosporum* sp. Coffs Harbour extend to the mid slope into *Eucalyptus* spp. dominated forest (*E. microcorys, E. grandis, E. saligna, E. acmenoides*) (Anon. *in litt.* October 2021).

5. The geographic distribution of *Pittosporum* sp. Coffs Harbour is very highly restricted. The area of occupancy (AOO) was estimated to be 16 km^2, based on the species' occupying four 2 x 2 km grid cells, the spatial scale of assessment recommended by IUCN (2019). The extent of occurrence (EOO) was also estimated to be 16 km^2. The EOO is reported as equal to AOO, despite the range of the species (estimated to be approximately 3 km^2) measured by a minimum convex polygon containing all the known sites of occurrence, being less than AOO. This is to ensure consistency with the definition of AOO as an area within EOO, following IUCN Guidelines (2019).

6. *Pittosporum* sp. Coffs Harbour is a clonal species (RCfER 2021), apparent from the growth form comprising multiple stems emerging from the ground linked by an underground root system (Anon *in litt.* October 2021). The stems generally grow 0.5-1 m high, with a maximum height of 1.3 m and form a low thicket. Patches of *P.* sp. Coffs Harbour vary in size from <2 to 15 m^2 or more and have a few to over 500 individual stems. Some patches are very small, consisting of <10 stems, and a few occurrences are single stems, suggesting they may have arisen from rare seedling recruitment events. Observations from monthly visits to the largest site of *Pittosporum* sp. Coffs Harbour between January and July 2021 showed seed production was very low, with a total of only 15 fruits recorded. The red fleshy seeds are displayed in opened fruit against a bright yellow background formed by the inside surface of the open fruit valves, indicating seeds of the species may be dispersed by birds. The few seeds in

these open fruits appeared to be viable (i.e. filled out). Observations at the start of a second season in September 2021 showed flowers were fairly common in the *P.* sp. Coffs Harbour patches, but initial post-flowering observations indicate very low fruit set (none observed) so far. Whilst flowering in September lasts about 4 weeks, the fruit maturation period to fruit opening may be about six months, so observations in the coming months are required to estimate how many mature fruits are produced in the current fruiting season.

7. The total number of mature individuals of *Pittosporum* sp. Coffs Harbour is estimated to be very low. Estimating the number of mature individuals in clonal species requires interpretation of the composition of independent reproductive units (*sensu* IUCN 2019). It is not known if the individual stems within the patches of *Pittosporum* sp. Coffs Harbour can survive independently as they are linked by underground roots. A genetics study confirmed clonality and high levels of inbreeding (RCfER 2021). Using a precautionary approach, the best indicator for the number of mature individuals of *P*. sp. Coffs Harbour is likely to be the total number of patches (67 (November 2021)), in line with the genetic findings (RCfER 2021).

8. *Pittosporum* sp. Coffs Harbour is in immediate threat from clearing and road construction works. The largest site, containing an estimated 45% of the total known population, is under threat from the approved highway bypass project at Coffs Harbour. Other threats to *Pittosporum* sp. Coffs Harbour are from land clearing, habitat disturbance from agricultural activities and urban development, recreational impacts and rubbish dumping. One of the known sites is within a State Forest and one is in a Nature Reserve.

9. *Pittosporum* sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) is eligible to be provisionally listed in Schedule 1 as a Critically Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee:
   (a) the species:
      (i) although not previously known to have existed in New South Wales, is believed on current knowledge to be native to New South Wales,
      (ii) is subject to an immediate and significant threat of extinction, and
   (b) the species is not listed in Schedule 1 as an endangered or critically endangered species.

Dr Anne Kerle
Chairperson
NSW Threatened Species Scientific Committee

References:

IUCN Standards and Petitions Committee (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Committee. Accessed from http://www.iucnredlist.org/documents/RedListGuidelines.pdf.

NSW TSSC (2020) Guidelines for interpreting listing criteria for species, populations and ecological communities under the NSW Biodiversity Conservation Act 2016. Version 2.1. NSW Threatened Species Scientific Committee, June 2020. Accessed at: https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/guidelines-for-interpreting-listing-criteria-20200601.pdf?la=en&hash=113049887E7375BF0E301474D4E27287A4273F72

PlantNET (The NSW Plant Information Network System) Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au (accessed 3rd November 2021) at https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Pittosporum~sp.+Coffs+Harbour+(A.S.Benwell+342,+NSW1102028)

Research Centre for Ecosystem Resilience (2021) Report for Stage #1 of Conservation genomic project on *Pittosporum* sp. 'Coffs Harbour'. Unpublished report prepared by the Research Centre for Ecosystem Resilience (Royal Botanic Garden Sydney).

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

Overall Assessment Outcome:
Pittosporum sp. Coffs Harbour (A.S.Benwell 342, NSW1102028) was found to be eligible for listing as Critically Endangered under Clause 4.4 (a), (d)(i), (e)(i)(ii)(B).

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Vulnerable under Clause 4.2 (1)(c)(2)(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:			
	(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,ii,iii,iv).

*Although *Pittosporum* sp. Coffs Harbour meets the threshold for very highly restricted geographic distribution (EOO) for a Critically Endangered species, one of the required conditions for listing is only met at the Endangered threshold (i.e. (d) there are 4 locations) as per NSW TSSC Guidelines (2020).

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: Critically Endangered under Clause 4.4 (a), (d)(i), (e)(i)(ii)(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: Endangered under Clause 4.5 (b).

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.