Exhibition period: 30/11/18 – 25/01/19 Proposed Listing date: 30/11/18

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 the small tree *Acacia dangarensis* Tindale & Kodela as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Acacia dangarensis* Tindale & Kodela from Part 2 of Schedule 1 (Endangered species) of the Act. Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Acacia dangarensis 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^2 and an extent of occurrence of 4 km^2; ii) the species is only known to occur at one location; and iii) there is a projected continuing decline in the the abundance the species.

The NSW Threatened Species Scientific Committee has found that:

1. *Acacia dangarensis* Tindale & Kodela (family Fabaceae) is described as a "Small tree to 10 m high; bark at first smooth and grey, later fissured and blackish at base; branchlets ± terete with low ridges, glabrous. Leaves with petiole 0.7–4.5 cm long, with 1 prominent gland; rachis 1.5–6.0 cm long, ± glabrous or with very sparse hairs, jugary glands present, interjugary glands absent; pinnae 2–6 pairs, 3–8 cm long; pinnules 14–30 pairs, linear, mostly 4–9 mm long (range: 2.0–13.5 mm long), 0.25–0.40 mm wide, ± glabrous. Inflorescences in terminal or axillary panicles; peduncles 1–3 mm long, glabrous; heads globose, 12–26-flowered, 3.0–4.5 mm diam., bright yellow. Pods ± straight, ± flat, mostly ± straight-sided to barely constricted between seeds, 3–8 cm long, 5–7 mm wide, firmly papery to thinly leathery, glabrous; seeds longitudinal; funicle filiform and expanded towards seed" (PlantNET 2017). *Acacia dangarensis* is distinguished from its closest relative *A. decurrens* by its branchlets being terete with several low longitudinal ridges to c. 0.2 mm high (versus prominently winged with ridges to 2 mm high), leaves with rachis (1.6–)3–6 cm long (versus 2–12 cm long), 2–6 pairs of pinnae (versus 3–13) and a gland often present above each secondary pulvinus (versus absent), and flower heads 2–4 mm in diameter (4–7 mm diam.) (Tindale and Kodela 1991).

2. *Acacia dangarensis* is endemic to New South Wales and is currently known to be confined to the summit and surrounding slopes of Mount Dangar south of Merriwa, predominately within Goulburn River National Park (Tindale and Kodela 1991).

3. *Acacia dangarensis* occurs in pure stands or as a co-dominant tree (with *Eucalyptus moluccana*) in sclerophyll woodland. Other co-occurring species include trees (*Brachychiton populneus* and *Callitris glaucophylla*), shrubs (*Notelaea microcarpa*, *Nyssanthes diffusa*, *Solanum* spp., *Abutilon oxycarpum*, *Spartothamnella juncea*, *Senecio linearifolius* var. d*angarensis*), grasses, herbs and forbs (*e.g*. *Microlaena stipoides*, *Poa labillardieri*, *Rytidosperma* spp., *Austrostipa verticillata*, *Oplismenus imbecillis*). Recent surveys have found a lack of recruitment occurring in most of the *A.*

dangarensis population on Mt Dangar (Bell 2013). Some recruitment has been observed after disturbance associated with land clearing on the footslopes of Mt Dangar and outside of Goulburn River National Park. *Acacia dangarensis* flowers from August to September and fruits frequently, but seedlings have rarely been observed in the wild. The species has a persistent soil seed bank and seed dormancy is broken by heat shock, resulting in germination if moisture is available (Bell 2013). It is likely that the current absence of fire over an extended period has resulted in the observed lack of recruitment (Bell 2013).

4. *Acacia dangarensis* has a very highly restricted geographic distribution. The area of occupancy (AOO) and extent of occurrence (EOO) are both estimated to be 4 km^2. The AOO is based on a single 2 x 2 km grid cell, the scale recommended for assessing AOO by IUCN (2017). The EOO is reported as equal to AOO, despite the range of the species, 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 (2017).

5. Bell (2013) estimated a total population size for *Acacia dangarensis* to be around 30,000 plants. This estimate was based on the mean density of stems in five 500 m^2 survey areas. Using lower and upper recorded stem densities to estimate possible population bounds, estimates range from 16,000 to 47,000 plants. Some 85–90% of these are thought to be mature (S. Bell, pers. comm. February 2017). This results in an estimate of approximately 27,600 (range 13,600–40,000) mature individuals. Bell (pers. comm. December 2016) noted that Bell (2013) may have overestimated abundance because denser stands were preferentially sampled. Consequently, the true number of individuals may be lower than the lower bound estimated above.

6. Threats to *Acacia dangarensis* include inappropriate fire regimes, weeds and potentially feral herbivores on seedlings. *Acacia dangarensis* is an obligate seeder and is expected to recruit seedlings after fire, contingent on availability of viable seed (*i.e*. a persistent soil seed bank) and fire and post-fire conditions being appropriate for seed germination, establishment and survival (*i.e*. seeds are promoted to germinate, adequate post-fire rainfall occurs and seedlings are not outcompeted by weeds nor eliminated by herbivores). The time since the last fire on Mt Dangar is unknown. It is thought to be > 20 years and local knowledge suggests a fire occurred there during the 1950s (Bell 2013). The standing population is currently in decline as indicated by presence of dead standing and fallen individuals and an absence of seedlings and juveniles (Bell 2013). From these observations it is inferred that the seedbank is also in decline. Declines in the soil seedbank are also likely to be exacerbated by reduced fecundity associated with competition from introduced species such as Prickly Pear (*Opuntia stricta*), a Weed of National Significance (Australian Government 1999), which is present over most of the range of *A. dangarensis* (Bell 2013). These factors are also likely to prevent recruitment that might occur infrequently in the absence of fire when gaps are created by senescence of standing plants.

7. *Acacia dangarensis* Tindale & Kodela 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*:

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)

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 Clause C)
Assessment Outcome: Not met

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: Vulnerable via 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 Marco Duretto
Chairperson
NSW Threatened Species Scientific Committee

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