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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 *Acacia chrysotricha* Tindale as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Acacia chrysotricha* Tindale in 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 chrysotricha Tindale was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(a)(d)(e iii) because: 1) the species has a very highly restricted Extent of Occurrence of 28 km^2; 2) it is known from a single threat-defined location; and 3) continuing decline has been observed and is expected to continue in the quality of habitat due to the combined effects of weed invasion and timber harvesting activities.

The NSW Threatened Species Scientific Committee has found that:

1. *Acacia chrysotricha* Tindale (family Fabaceae), commonly known as the Newry golden wattle or Bellinger River wattle, is described in PlantNET (2004) as an "Erect tree usually 6–15 m high; bark finely or deeply fissured, grey to red-brown; branchlets ± terete with low ridges, densely yellowish-hairy at first, later the hairs greyish or fawn. Leaves ± sessile on pulvinus, with petiole to 0.1 cm long above pulvinus; rachis 5–14 cm long, densely hairy, circular jugary glands irregularly present at the lowest 1–3 pairs and/or upper 1–3 pairs of pinnae, interjugary glands absent or rarely an odd one present; pinnae 8–18 pairs, 1–4.7 cm long; pinnules mostly 12–25 pairs (6 or more on basal pinnae), oblong to narrowly oblong, elliptic-oblong or ± lanceolate, recurved when dry, mostly 3–4.5 mm long and 1–1.5 mm wide, with fine white or golden hairs mainly on margins and midvein. Inflorescences in axillary and terminal racemes and panicles; peduncles 3–6 mm long, golden-hairy; heads globose, 15–30-flowered, 4–7 mm diam., bright yellow. Pods straight to slightly curved, ± flat, mostly barely to slightly constricted between seeds, 3–10 cm long, 4–6 mm wide, firmly papery thinly leathery, with long fine hairs; seeds longitudinal; funicle ± encircling the seed. Flowering July-August".

2. *Acacia chrysotricha* is endemic to New South Wales (NSW) and is currently only known from two subpopulations in the catchment of the Kalang River south of Bellingen on the NSW mid-north coast. The largest known subpopulation of *A. chrysotricha* spans a ridgeline within Newry State Forest (SF), Jaaningga Nature Reserve (NR), and adjacent private property (Richards 2011; Hunter 2017). Jaaningga NR, Gladstone SF and Newry SF are included within the proposed Great Koala National Park announced by NSW Government (2025) The second subpopulation is in Gladstone SF, approximately 3.4 km to the west of the Jaaningga NR subpopulation.

3. The *Acacia chrysotricha* population is estimated to contain 2,500–4,200 mature individuals based on the latest survey data (Hunter 2020; NSW OEH 2018). Hunter (2017) estimated that there were approximately 25,000 (+/- 5000) individuals (including juveniles) within Jaaningga Nature Reserve based on observations within 40 plots distributed across a range of environments and vegetation associations where *A. chrysotricha* is found. A subsequent survey between 2018 and 2020 included an additional 43 plots within Jaaningga NR and Newry SF (Hunter 2020). Demographic profiles for 2017 and 2020 monitoring were broadly similar; however, the number of individuals had reduced, and in 2020 the subpopulation was estimated to be 20,000 (+/- 5000) with approximately 16% of the subpopulation found to be of reproductive age leading to an estimate of 2,500–4,200 mature individuals in the study area (Hunter 2020). The subpopulation at Gladstone SF occurs within a eucalypt plantation managed for hardwood production and was estimated to be approximately 30 individuals in 1997 (NSW Scientific Committee 2000; NSW OEH 1997). All trees at this population observed in 2018 were senescent and in poor health (NSW OEH 2018).

4. *Acacia chrysotricha* has a very highly restricted geographic distribution. The extent of occurrence (EOO) is reported as equal to AOO (28 km^2) following the methodology of the IUCN (2022).

5. *Acacia chrysotricha* is an understorey to mid-storey species that grows in eucalypt forests and on the margins of warm temperate rainforests in steep narrow gullies and along intervening ridges (Kodela and Harden 2002). Soils where this species occurs are described as metamorphosed sediments with substantial amounts of free quartzitic gravel (Kodela and Harden 2002). In Jaaningga NR, *A. chrysotricha* occurs in at least two vegetation communities. The first is in moister gully positions and with *Eucalyptus pilularis*, *Syncarpia glomulifera*, *E. saligna*, *E. ancophila, E. fusiformis*, and a dense understorey of rainforest tree and shrub species. The second community is described as a slightly drier, mid- to upper slope moist sclerophyll forest with very tall *E. pilularis*, *S. glomulifera*, *E. saligna*, *E. acmenoides,* and *E. carnea*, with a mid-dense understorey comprising mainly rainforest tree and shrub species (Richards 2011; Hunter 2017). The area where the Gladstone SF subpopulation occurs is described as open wet sclerophyll forest on an undulating east-facing slope, within a valley with sandy loam soils on sandstone (NSW OEH 2018). Co-occurring plant species at this site include *E. saligna*, *Callicoma serratifolia*, *Ozothamnus diosmifolius* and the introduced *Lantana camara* and *Solanum mauritianum* (NSW OEH 2018).

6. *Acacia chrysotricha* is a disturbance-responsive species that experiences strong self-thinning throughout its lifetime. The combination of a long lifespan and significant thinning as stands mature can lead to narrow age class ranges in the least disturbed and most disturbed locations (Hunter 2017). Flowering occurs primarily in July and August, with fruiting in November (PlantNET 2004). While bees and wasps are considered the most important pollinators, other insects such as hoverflies, beetles and butterflies also contribute to the pollination of *Acacia* species to varying extents (Stone *et al.* 2003; Fleming *et al.* 2007). Birds may also assist pollination for some *Acacia* species as they forage for nectar produced by the jugary glands, which are abundant on *A. chrysotricha* (Knox *et al.* 1985;

Vanstone and Paton 1988; Fleming *et al.* 2007). Seed dispersal is likely to occur abiotically through soil disturbance and water flow, as well as biotically via possums, birds, ants and other opportunistic fauna species (Armstrong 1979; Gibson *et al.* 2011).

7. The standing plant longevity of *Acacia chrysotricha* is estimated to be approximately 30 to 60 years, based on related species in similar habitats (Richards 2011; Hunter 2017). The juvenile period is estimated to be between 5–10 years, based on similar species and field observations (Richards 2011). Previous studies have estimated the half-life of the seeds of other *Acacia* species to be approximately 10–18 years (Auld 1986; Holmes and Newton 2004), and it is estimated that *Acacia* seeds can remain viable in the soil for 50 to 100 years due to their hard seed coat (Farrell and Ashton 1978; Auld 1987; Gibson *et al.* 2011). The generation length of *A. chrysotricha* is estimated to be approximately 15–28 years.

8. *Acacia chrysotricha* is a fire-sensitive obligate seeder. Individuals at all life stages are highly susceptible to death from fire but exhibit high levels of recruitment even after mild fires (Hunter 2017; M. Smith *in litt.* January 2024). The physical dormancy of the seeds is typically broken by heat from fire (Ooi 2012; Ooi *et al.* 2014). This allows for dormancy to be broken after a fire, allowing the entry of water for subsequent germination and emergence during elevated post-fire levels of resources (light, nutrients, water), and time to reach maturity and replenish seedbanks before the next fire occurs (Liyanage and Ooi 2017; Pausas and Lamont 2022).

9. *Acacia chrysotricha* is threatened by adverse fire regimes exacerbated by climate change, weed encroachment and timber harvesting activities. The majority of the population occurs in Jaaningga NR, which offers protection from some threats and disturbances (NSW NPWS 2012). However, parts of the population in Newry SF and Gladstone SF are in areas that are managed for conservation, timber harvesting and recreation, and are more susceptible to threats associated with timber harvesting, trackwork and other disturbances, noting that these activities also provide the opportunity for recruitment. ‘High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition’, ‘Anthropogenic climate change’, and ‘Invasion, establishment and spread of lantana (*Lantana camara* L. *sens. lat*)’ are listed as Key Threatening Processes under the Act.

10. *Acacia chrysotricha* occurs at 1–2 threat-defined locations as per the IUCN definition (IUCN 2022) on the basis of adverse fire regimes being the most serious plausible threat resulting in the lowest number of locations. All records of *A. chrysotricha* within Jaaningga NR and Newry SF occur on a steep northerly facing slope that could be affected by a single fire (M. Smith *in litt*. January 2024). The Gladstone SF subpopulation, although only 3–4 km distant, is separated from the Jaaningga subpopulation by cleared agricultural lands and the valley of Spicketts Creek, meaning the fire histories of the sites differ considerably, with no single fire recorded crossing the valley (SEED data), and therefore each site could be considered a separate location based on historical fire history. However, rising

temperatures and longer dry periods due to climate change are expected to cause higher fire frequency and severity, and with projected increases in fire danger weather due to climate change, it is plausible that a single fire could burn both sites under the right conditions. Consequently, a large high-severity fire has the capacity to kill a large portion of the standing plants while also impacting the soil-stored seed, and further reductions in the seedbank may occur if subsequent fires occur too quickly for plants to grow and replenish the seedbank. When taking a precautionary but realistic approach resulting in the lowest number of possible locations, as recommended by the IUCN (2022), *A. chrysotricha* is considered to occur in a single threat-defined location.

11. *Acacia chrysotricha* has experienced observed past declines, and is inferred to be undergoing a continuing decline, in the quality of habitat due to the combined effects of weed invasion (particularly *Lantana camara*) and human disturbance from timber harvesting, track building and maintenance. The adverse effects are particularly evident at the Gladstone SF subpopulation, which is a small stand occurring on the edge of an active Eucalypt plantation managed for hardwood production. Harvest history indicates the area was harvested in June 2000 (FCNSW 2025). Observations in 1997 and 2018 describe the *A. chrysotricha* trees as senescent and in poor health with no sign of recruitment. This suggests that competition and suppression from the plantation and associated heavy infestations of lantana have contributed to declines in habitat quality and consequent poor health and dieback within the subpopulation, and hindered recruitment without which the subpopulation may be lost. While activities such as timber harvesting, track building and maintenance can trigger some recruitment through disturbance, the recruitment from these disturbances is generally sporadic and in low densities compared to fire, which is the primary form of recruitment (Richards 2011). These activities can also lead to plant deaths through physical damage or removal as was observed during surveys by Hunter *et al.* (2020). Additionally, these disturbances facilitate weed invasion, with lantana the most problematic weed within the range. Lantana invades disturbed areas such as roadsides, cultivated pastures and fence lines, having its greatest density in highly degraded areas (Hotspots Fire Project 2017), including areas heavily disturbed in the recent past by timber harvesting operations (NSW NPWS 2012). High-density lantana infestations have been observed to suppress recruitment and survival of *A. chrysotricha* seedlings and contribute to ongoing declines in the quality of habitat throughout the species' range.

12. *Acacia chrysotricha* Tindale 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 near future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

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

Overall Assessment Outcome:
Critically Endangered under Clause 4.3(a)(d)(e iii)

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 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 Clause 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: 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 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.

Professor Angela Moles FRSN
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

DCCEEW (Department of Climate Change, Energy, the Environment and Water) (2024). Conservation Assessment of *Acacia chrysotricha* Tindale (Fabaceae). NSW Threatened Species Scientific Committee.

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