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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 the orchid *Diuris disposita* D.L.Jones as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Diuris disposita* D.L.Jones in Part 2 of Schedule 1 (Endangered Species). Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Diuris disposita D.L.Jones was found to be Critically Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: 4.2(1 a)(2 b) and Clause 4.4(a)(d i)(e i,ii A(I)) because: 1) it has experienced and is projected to continue experiencing a very severe reduction in population size; 2) it has a small population experiencing a very high rate of decline; and 3) it has extremely low numbers of individuals in all subpopulations.

The NSW Threatened Species Scientific Committee has found that:

1. *Diuris disposita* D.L.Jones (family Orchidaceae) is a terrestrial herb with one or two linear leaves, 15–30 cm long, 4–5 mm wide, conduplicate; bearing a raceme 20–35 cm high, 2–7-flowered, with widely spaced yellow flowers with brown markings on the labellum and dorsal sepal, *c.* 2 cm across; dorsal sepal ovate, 7–11 mm long, 4–7 mm wide, obliquely erect, margins recurved; lateral sepals linear to oblanceolate, 10–24 mm long, 1.5–2 mm wide, deflexed, parallel or crossed; petals obliquely erect; lamina broad-elliptic to obovate, 6–9 mm long, 4.5–6.5 mm wide; claw 4–7 mm long; labellum 7–9 mm long; lateral lobes linear to oblong, 2–2.8 mm long, 0.8–1.2 mm wide; midlobe narrow-ovate to ovate when flattened, 4–7 mm wide, ridged along midline; callus of 2 divergent, incurved ridges *c.* 4.5 mm long (Jones 1991).

2. *Diuris disposita* occurs near Kempsey on the mid-north coast of New South Wales (NSW). The species occurs across six extant subpopulations (as per the IUCN (2024) definition): at Rollands Plains, Yarravel Nature Reserve (NR), Armidale Road west of Kempsey, Jacks Crossing, and at two private properties in the Collombatti area. One additional subpopulation at Collombatti was last surveyed in 2006 and is possibly still extant (Eco Logical Australia 2019). There are five historical records of subpopulations at Temagog Road (last reported in 1986), northwest of Hickey's Creek at Willawarrin (1992), southeast of Kempsey (1992), Dondingalong (1993) and at Skillion NR (undated) (Eco Logical Australia 2019). None of these subpopulations have been re-found, despite recent survey effort in 2019 and 2020 at the Temagog Road and Willawarrin sites (Eco Logical Australia 2019), and they may now be extinct.

3. The total population size of *Diuris disposita* is very low, and is estimated at 123–154 mature individuals, based on average subpopulation counts from the last five years for likely extant subpopulations, and projected declines in the larger subpopulation at Collombatti which was last surveyed in 2018. The maximum and minimum population estimate is 115–193 mature individuals, based on the most

recent subpopulation counts (115 plants) and maximum subpopulation counts from the last five years (193 plants). The largest subpopulation of *D. disposita* at Collombatti comprised 71 flowering plants in 2018, and if similar declines as seen in more regularly monitored subpopulations (Rollands Plains and Yarravel) have occurred, this subpopulation may have as few as 40 plants by 2024. All other extant subpopulations are estimated to contain less than 30 mature individuals.

4. The geographic distribution of *Diuris disposita* is highly restricted. The Area of Occupancy (AOO) has been calculated as 24 km^2 based on likely extant subpopulations, or 28 km^2 if the Collombatti subpopulation last recorded in 2006 is included, calculated using 2 x 2 km grid cells, the scale recommended by IUCN (2024). The Extent of Occurrence (EOO) is less certain because the precise location of one of the six likely extant subpopulations (the Collombatti subpopulation recorded in 2022) is unknown, other than it being located on private property "near the rail line in Collombatti". Estimating possible sites near the rail line in Collombatti suggest EOO values when this subpopulation is included could be around 120–150 km^2, or 130–160 km^2 if the possibly extant Collombatti subpopulation last recorded in 2006 is also included. The EOO is based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2024).

5. *Diuris disposita* occurs in open forest and grassland from 40–60 m a.s.l. It occurs in a variety of habitats including derived grassland in broad river valley dominated by *Themeda triandra* resulting from partially-cleared dry sclerophyll forest, undulating hills and low ridgetops in dry sclerophyll forest in a semi-shaded understorey among tussocks and derived native grassland on the edge of dry sclerophyll forest (Eco Logical Australia 2020; NSW DCCEEW 2024). Associated species include *Corymbia intermedia*, *C. maculata*, *Eucalyptus siderophloia*, *E. propinqua*, *Acacia falcata*, *A. implexa*, *A. subfalcata*, *Allocasuarina torulosa*, *Lophostemon confertus*, *Notelaea* sp., *Pultenaea villosa*, *Dianella* sp., *Microtis parviflora*, *Themeda triandra*, *Sorghum leiocladum*, *Dichelachne micrantha*, *Entolasia stricta*, *Pomax umbellata*, *Cheilanthes sieberi* subsp*. sieberi*, *Lobelia purpurascens*, *Lomandra longifolia*, and the non-indigenous *Lantana camara* (Eco Logical Australia 2020; NSW DCCEEW 2024).

6. *Diuris disposita* typically flowers in late September to early October (Eco Logical Australia 2019). *Diuris disposita* possesses a tuber and can persist in a dormant state during unfavourable conditions, with most *Diuris* producing replacement tubers each season as the existing tuber senesces, and some species reproduce by production of daughter tubers on stolonoid roots (Jones 2021). It is not known if *Diuris disposita* also produces daughter tubers, however long periods of dormancy are associated with increased mortality of adult plants in other Australian terrestrial orchids (Coates *et al.* 2006). Subpopulations from grassland habitat appear responsive to slashing, which stimulates flowering (Eco Logical Australia 2019). The species' response to fire is not documented, however other spring-flowering *Diuris* species from grassy habitats generally display increased flowering following dormant-season fire (Eco Logical Australia 2019).

7. *Diuris* species are thought to be pollinated mainly by native bees (Indsto *et al.* 2006, 2007; Scaccabarozzi *et al.* 2020). Many *Diuris* species have flowers that resemble

those of Fabaceae (e.g. *Bossiaea, Daviesia*, *Pultenaea*), with which the orchids often co-occur (Beardsell *et al.* 1986; Scaccabarozzi *et al.* 2020). *Diuris* are thought to use food deceptive guild mimicry to deceive pollinators, as their flowers usually possess little or no nectar rewards, however some species can produce small amounts of nectar *e.g., Diuris alba* (Indsto *et al.* 2007). Recent observations suggest that other insects may rob flowers of pollinia without transfer to other flowers (P. Sheringham *in litt*. 2025).

8. *Diuris* species take around three years to reach maturity in cultivation (M. Freestone pers. obs.). The maximum lifespan of *Diuris* is unknown, although *Diuris* species in cultivation generally have maximum lifespans of one to two decades (M Freestone pers. obs.). Based on this, the minimum generation length of *D. disposita* is estimated as 6.5 years, and the maximum generation length is estimated as 11.5 years. Using the average of the maximum and minimum estimates gives an estimated generation length of 9 years, and an estimated three generation period of 27 years.

9. There are several identified threats to *Diuris disposita*. These include adverse biomass management (particularly a lack of suitable disturbances to reduce competition, and/or slashing during the flowering period), adverse fire regimes (particularly out of season fires), fragmentation due to agricultural activities and/or roadworks, increased frequency of drought and extreme rainfall events due to climate change, competition from lantana (*Lantana camara*) and other weeds, and poaching and trampling. 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', 'Clearing of native vegetation', 'Anthropogenic climate change', and 'Invasion, establishment and spread of Lantana (*Lantana camara*)' are listed as Key Threatening Processes under the Act.

10. *Diuris disposita* is found at one threat-defined location when considering the most serious plausible threat of increased frequency of drought and extreme rainfall events due to climate change which may negatively affect reproduction and tuber survival. This threat appears to be a driver of the complete failure of flowering of the species in three subpopulations monitored in 2023 (P. Sheringham pers. comm. April 2024), which indicates the potential of the threat to cause the elimination of the species within a single generation (nine years) should conditions not abate.

11. At Rollands Plains, *Diuris disposita* has experienced and is projected to continue experiencing a very severe reduction in population size, estimated or projected at approximately 92% across a three-generation period in the past and/or future. The Rollands Plains and Yarravel subpopulations have been monitored annually from 2019–2024, with an average of 25 and 4 plants recorded at the two subpopulations respectively over this time. This suggests an estimated population reduction of approximately 83% has occurred at Rollands Plains in 18 years from 2006 (*c*. 150 plants) to 2024 (*c*. 25 plants). Similarly, an estimated population reduction of approximately 80% has occurred at Yarravel in 20 years from 2004 (maximum of 20 plants) to 2024 (*c*. 4 plants). However, the decline across a three-generation period is likely to be higher than 80–83% percent, given that this decline occurred across a period of time roughly two thirds the length of the species' three

generation period. Using an exponential decay model, it is estimated that the Rollands Plains and Yarravel subpopulations has undergone a combined decline of 92% in the 27 years to 2024. Projecting into the future from 2024, or commencing in 2005 and projecting forward to have a window of time in both the past and future also gives a projected decline of 93% across the Rollands Plains and Yarravel subpopulations using the same estimated decay rate. Using the exponential decay model also allows subpopulation decline at Rollands Plains and Yarravel across one generation (nine years) to be projected at 53%.

12. The very severe reductions estimated and projected across the Rollands Plains and Yarravel subpopulations are considered to be representative of the species' population as a whole, and similar reductions are inferred for where population trend data are incomplete or absent (all Collombatti subpopulations, the Armidale Road subpopulation and the Jacks Crossing subpopulation). In addition, five or six subpopulations may have become extinct since 1986, suggestive of a significant decline of the species' population more broadly due to the threats listed above.

13. *Diuris disposita* D.L.Jones 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*:

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(1 a)(2 b) and Clause 4.4(a)(d i)(e i,ii A(I))

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Critically Endangered under Clause 4.2(1 a)(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)

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 A(I))

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.

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Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Freestone M (2024) Conservation Assessment of *Diuris disposita* D.L.Jones (Orchidaceae). NSW Threatened Species Scientific Committee.

References:

Beardsell DV, Clements MA, Hutchinson JF, Williams EG (1986). Pollination of *Diuris maculata* R Br (Orchidaceae) by floral mimicry of the native legumes *Daviesia* spp. and *Pultenaea scabra* R Br. *Australian Journal of Botany* **34**, 165–173.

Coates F, Lunt ID & Tremblay RL (2006). Effects of disturbance on population dynamics of the threatened orchid *Prasophyllum correctum* DL Jones and implications for grassland management in south-eastern Australia. *Biological Conservation* **129**, 59–69.

Eco Logical Australia (2019) The distribution and abundance of *Diuris disposita*, an endangered ground orchid – 2019 season. Unpublished report for the NSW Department of Planning, Industry and Environment.

Eco Logical Australia (2020) 2020 *Diuris disposita* survey in the Kempsey district. Unpublished report for the NSW Department of Planning, Industry and Environment.

IUCN (International Union for the Conservation of Nature) (2024). Guidelines for Using the IUCN Red List Categories and Criteria. Version 16 (March 2024). Standards and Petitions Committee of the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

Indsto JO, Weston PH, Clements MA, Dyer AG, Batley M, Whelan RJ (2006). Pollination of *Diuris maculata* (Orchidaceae) by male *Trichocolletes venustus* bees. *Australian Journal of Botany* **54**, 669–679.

Indsto JO, Weston PH, Clements MA, Dyer AG, Batley M, Whelan RJ (2007). Generalised pollination of *Diuris alba* (Orchidaceae) by small bees and wasps. *Australian Journal of Botany* **55**, 628–634.

Jones DL (1991) New taxa of Australian Orchidaceae. *Australian Orchid Research* **2**: 55.

NSW DCCEEW (Department of Climate Change, Energy, the Environment and Water) (2024) BioNet records for *Diuris disposita*. NSW Department of Climate Change, Energy, Environment and Water.

Scaccabarozzi D, Guzzetti L, Phillips RD, Milne L, Tommasi N, Cozzolino S, Dixon KW (2020). Ecological factors driving pollination success in an orchid that mimics a range of Fabaceae. *Botanical Journal of the Linnean Society* **194**, 253–269.