

NSW Threatened Species Scientific Committee

Notice of Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal 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.

How to make a submission

The NSW TSSC welcomes public involvement in the assessment process and places preliminary determinations on public exhibition on the NSW TSSC pages on the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) website. This public exhibition provides an opportunity for the public to comment on this preliminary determination as well as provide any additional information that is relevant to the assessment.

Postal submissions regarding this Preliminary Determination may be sent to:

Secretariat
NSW Threatened Species Scientific Committee
Locked Bag 5022
Parramatta NSW 2124.

Email submissions in Microsoft Word or PDF formats to:

scientific.committee@environment.nsw.gov.au

Submissions close 13 December 2024

What happens next?

After considering any submissions received during the public exhibition period the NSW TSSC will make a Final Determination and a notice will be placed on the NSW DCCEEW website to announce the outcome of the assessment. If the Final Determination is to support a listing, then it will be added to the Schedules of the Act when the Final Determination is published on the legislation website. www.legislation.nsw.gov.au.

Privacy information

The information you provide in your submission may be used by the NSW TSSC in the assessment to determine the conservation status and listing or delisting of threatened or extinct species, threatened populations and threatened or collapsed ecological communities or to assess key threatening processes.

The NSW TSSC may be asked to share information on assessments with NSW Government agencies, the Commonwealth Government and other State and Territory governments to collaborate on national threatened species assessments using a common assessment method and to assist in the management of species and ecological communities.

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If your submission contains information relevant to the assessment it may be provided to state and territory government agencies and scientific committees as part of this collaboration.

If you wish your identity and personal information in your submission to be treated as confidential you must:

- *request your name be treated as confidential, and*
- *not include any of your personal information in the main text of the submission or attachments so that it can be easily removed.*

Senior Professor Kristine French
Chairperson
NSW Threatened Species Scientific Committee

NSW Threatened Species Scientific Committee

Public Exhibition period: 13/09/2024 - 13/12/2024

Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal 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,e) and Clause 4.4(a)(d i) because: 1) it has experienced and is projected to continue experiencing a very severe reduction in population size; and, 2) it has a small population experiencing a very high rate of decline.

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 four extant subpopulations (as per the IUCN (2024) definition): at Rollands Plains, Yarravel NR, 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 120 mature individuals, based on average subpopulation counts from the last five years for likely extant subpopulations. The maximum and minimum population estimate is 71–169 mature individuals, based on the most recent subpopulation counts (71 plants) and maximum subpopulation counts from the last five years (169 plants).
4. The geographic distribution of *Diuris disposita* is highly restricted. The Area of Occupancy (AOO) has been calculated as 16 km² based on likely extant

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subpopulations, or 20 km² 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 more difficult to estimate for *D. disposita*, because the precise location of one of the four 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 90–120 km², or 100–130 km² if the Collombatti subpopulation last recorded in 2006 is included. This suggests the EOO of *D. disposita* is more likely to be >100 km² than <100 km². 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*, *Lobelia purpurascens*, *Lomandra longifolia*, and the non-indigenous *Lantana camara* (Eco Logical Australia 2020; NSW DCCEEW 2024).
6. *Diuris disposita* flowers in late September to early October (Eco Logical Australia 2019). While *Diuris disposita* possesses a tuber and can persist in a dormant state during unfavourable conditions, 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 (EcoLogical 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 (but can produce small amounts of nectar e.g., *Diuris alba* in Indsto *et al.* 2007).
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

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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 reduction regimes (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 impact 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 92–93% across a three-generation period in the past and/or future. The Rollands Plains subpopulation has been monitored annually from 2019–2023, with counts of 48, 61, 12 and 0 plants respectively, equating to an average of 30 plants. This suggests an estimated population reduction of approximately 80% at Rollands Plains in 17 years from 2006 (c. 150 plants) to 2023 (c. 30 plants). However, the decline across a three-generation period is likely to be higher than 80% 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 subpopulation has undergone a decline of 92% in the 27 years to 2024. Using the same model, projecting into the future from 2024 gives the same projected decline of 93% assuming that the current drivers of decline continue, or commencing in 2006, the projected decline of the Rollands Plains subpopulation at the end of a three-generation period of 27 years in 2037 is 92%. Using the exponential decay model also allows subpopulation decline at Rollands Plains across one generation (nine years) to be projected at 43%.
12. The very severe reductions estimated and projected at the Rollands Plains subpopulation are considered to be representative of the species' population as a whole, as the subpopulation at Yarravel NR also appears to be declining and declines are inferred for subpopulations that lack time series observations are lacking (all Collombatti subpopulations). 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

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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,e) and Clause 4.4(a)(d 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,e)

(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,

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	(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)

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

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	(c)	for vulnerable species	low.
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Clause 4.6 - Quantitative analysis of extinction probability (Equivalent to IUCN criterion E)

Assessment Outcome: Clause not met.

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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Senior Professor Kristine French
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.

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