Threatened Species Assessment

Diuris tricolor
Painted Diuris

Taxonomy

Diuris tricolor Fitzg.

This taxon was known until recently as *Diuris sheaffiana.* There is some doubt as to the correct name for this species, with the name *Diuris sheaffiana* Fitzg. rather than *D. tricolor* possibly applying (Backhouse et al. 2016).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1997).

Categorised as Endangered in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace+3ce+4ace; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(i,ii); D

Species Information

Description and Life History

The taxon is a flowering plant usually 20-40 cm tall, slender to moderately stout. Leaves 1-3, linear, channelled, 20-30 cm long. Flowers 2-6, erect, yellow to orange with white and purplish suffusions; dorsal sepal obliquely erect, broadly ovate, 10-15 mm long; lateral sepals deflexed, usually parallel, narrow-linear, greatly exceeding petals, 30-65 mm long; petals obliquely erect or recurved, ovate to elliptic, tapering to base, 13-21 mm long. Labellum 3-lobed from base, 8-12 mm long; lateral lobes erect, less than half as long as mid-lobe, oblong, margins crenulate; mid-lobe keeled, shortly clawed, ovate, margins irregular, with 2 longitudinal white and purplish ridges from the base ending in tooth-like processes less than midway along lamina. Column narrowly winged. The taxon flowers from September to November (VicFlora 2018). Little is known of the life history. The pollinator is probably a small native bee, and it is not known if the taxon is capable of vegetative reproduction, as are some other *Diuris* spp.

Generation Length

The generation length of *Diuris tricolor* is estimated to be 20 to 40 (midpoint 30) years. Generation time for non-colonial terrestrial orchids is estimated to be a nominal 30 years based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, each individual is susceptible to endogenous exhaustion or environmental causes of mortality at rates likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators (OSRs) reliant on seed-based recruitment for population maintenance.

Distribution

The taxon is known from just three plants occurring at a single location (Cassidy Gap Road), which is on private farmland near Almonds in north-eastern Victoria (VicFlora 2018). The sole surviving subpopulation occurring under a patch of trees in the corner of a farmer's paddock. There is almost none of the taxon's suitable habitat in any reserves in the district, so the chances of finding more populations are very low (Backhouse et al. 2016). Elsewhere, the taxon occurs in western NSW and southern Queensland, in Callitris-Eucalyptus woodland (SAC 1997).

Habitat

The taxon grows in remnant grassy woodland with White Cypress-pine (*Callitris glaucophylla/Callitris columellaris*) present, on light, well-drained sandy loam soils (Backhouse et al. 2016; VicFlora 2018). The altitude is 155 metres above sea level (Backhouse et al. 2016).

Threats

The taxon is known from just 3 plants occurring at a single location, which is on private land used for grazing and cropping. Plants have not been seen for several years, and the taxon may already be extinct. Over 98% of the plains grassy woodland vegetation type, including the taxon's habitat of Callitris-Eucalyptus woodland, has been destroyed for grazing, cropping and vineyards, and the little remaining is still subject to threatening processes. Very little of this vegetation type is protected in its reserves. Very small subpopulations are highly susceptible to stochastic events causing major decline or local extinction within a very short time frame.

The taxon will not survive without intensive and sustained management intervention. The taxon is urgently in need of effective conservation action to secure the remaining population and increase numbers of plants to ensure its ongoing presence in this State (Backhouse et al. 2016).

IUCN Criteria

Criterion A. Population size reduction.
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Evidence:

Eligible under Criterion A2 as Critically Endangered

The population reduction over the past 60 to 120 years is inferred to be 98 to 99%, based on (a), (c) and (e) above.

Past decline is based on historic, almost total, loss of habitat in the locality.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 60 to 100 years is projected to be 100%, based on (c) and (e) above.

Future decline is based on the estimate that a population of just 3 plants is highly unlikely to survive without management intervention.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is inferred to be 98 to 100%, based on (a), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Evidence:

Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is considered to occur in a single location since all key identified threats operate consistently across its extremely restricted geographic and ecological Victorian range. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 1 location and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

Criterion C. Small Population size and decline				
		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals				

Evidence:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 3 mature individuals, based on direct observation.

The number of mature individuals is inferred to continue to decline, based on the estimate that a population of just 3 plants is highly unlikely to survive without management intervention. The number of mature individuals in each subpopulation is 50 or fewer and the percentage of mature individuals in one subpopulation is 90-100 %.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	<·50	<·250	<·1,000
D2 Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.	-	-	D2. Typically: AoO <·20 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Critically Endangered

The taxon is estimated to have 3 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

Backhouse, G., Kosky, B., Rouse, D., and Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia.* Melbourne, Victoria: EBook.

Bishop, T. (1996). *Field Guide to the Orchids of New South Wales and Victoria*. New South Wales: University of New South Wales Press.

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SAC (1997). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 457 *Diuris tricolor.*

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens: *Diuris tricolor*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/20df8945-4dea-4fe9-a523-116a14b1dc76