



Diuris palustris Swamp Diuris

Taxonomy

Diuris palustris Lindl.

The taxon is known to form hybrids with *D. pardina*, *D. orientis*, *D. chryseopsis* and *D. basaltica*, the latter known as *D. X fastidiosa* (VicFlora, 2015).

Current conservation status

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

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

Proposed conservation status

Endangered in Victoria

Criteria A2ac+3c+4ac

Species Information

Description and Life History

The taxon is a flowering plant slender, 6-15 cm tall. Leaves 8-15, narrow, sub-terete, 2-8 cm long, channelled, usually twisted, in a loose, erect tussock, base crimson. Flowers porrect or nodding, 1-4, yellow, spotted or blotched with dark brown, darker on outer surface, faintly spice-scented; pedicel (excluding ovary) 2-5 cm long, slender, mostly enclosed within bract; dorsal sepal erect, recurved in upper part, ovate, 7-10 mm long, purple or dark brown behind anther, yellowish elsewhere; lateral sepals parallel, deflexed, linear, 12-15 mm long, green; petals obliquely erect or recurved, 7-10 mm long, claw dark red-brown, lamina ovate, often notched, yellow, usually with dark brown vertical stripe on back. Labellum deeply 3-lobed from base, 7-10 mm long, keeled; lateral lobes slightly shorter than mid-lobe, erect, oblong, with rounded teeth at tip, entire elsewhere; mid-lobe spathulate, folded, with 2 fleshy ridges from base to beyond middle, merging into a short ridge which terminates in a rounded swelling at the tip. Column wings higher than anther (VicFlora 2015).

The taxon flowers from August to November. Most *Diuris* species can multiply vegetatively, although several rely solely on reproduction from seed. Hot summer fires enhance flowering of many species. Natural hybridisation is common, with some hybrids apparently being fertile and producing a wide range of variation through backcrossing. Pollination is through simple food deception, the yellow-flowered species mimicking the bush-peas of the family Fabaceae, while the purple-flowered species mimic native irises (Backhouse et al. 2016).

Generation Length

The generation length of *Diuris palustris* 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 few, widely separated locations in the west of the state. The altitude ranges from 10-250 metres ASL. It also occurs in SA and Tas (Backhouse et al., 2016). The taxon is probably extinct in all former sites near Melbourne (VicFlora 2015).

Habitat

The taxon grows in a variety of habitats including grassland, heath, woodland and box ironbark forest, on sandy loam to gravelly clay loam soils (Backhouse et al. 2016; VicFlora 2015). Specifically, the taxon occurs mostly well inland in drier box-ironbark forest habitats, and less commonly in basalt plains grassland and coastal heaths and heathy woodland (Backhouse et al., 2016).

Threats

The taxon formerly occurred close to Melbourne, but almost all of its habitat has been lost to ever expanding urban and industrial development, and the taxon no longer occurs in the region (Backhouse et al. 2016). There have been significant population losses due to habitat clearance near Melbourne, western coastal regions and the basalt plains. Specifically, in the coastal areas, populations have been subject to habitat clearance and degradation due to human recreation activity. Populations are better conserved in the Western Goldfields and SW Victoria.

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%

<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p>	<p>based on any of the following:</p>	<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>
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Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 60 to 120 years is estimated to be 45 to 75%, based on (a) and (c) above.

Past decline is based on significant population losses due to habitat clearance near Melbourne, western coastal regions and the basalt plains. The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Endangered

The population reduction over the next 60 to 100 years is projected to be 20 to 50%, based on (c) above.

Future decline is based on habitat clearance and habitat degradation due to human recreation activity in coastal areas. These threats, while ongoing, should be at a lower rate since a larger proportion of the total population is now conserved in reserves. Losses are more likely to be gradual from ongoing habitat degradation and ongoing partial habitat loss.

Eligible under Criterion A4 as Endangered

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 70%, based on (a) and (c) above. The causes of reduction may not have ceased, be understood or be reversible.

Past decline is based on significant population losses due to habitat clearance near Melbourne, western coastal regions and basalt plains. Future decline is based on habitat clearance and habitat degradation.

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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 B as Vulnerable

The Area of Occupancy (AoO) is estimated to be 104 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas. Any two of (a), (b) or (c) above are also satisfied.

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:

Ineligible under Criterion C

It is estimated that there are 26,000 to 52,000 mature individuals, which exceeds the thresholds for criterion C.

Criterion D. Very small or restricted populations		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 km ² or number of locations ≤ 5

Evidence:

Ineligible under Criterion D

It is estimated that there are 26,000 to 52,000 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.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

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VicFlora (2015). Flora of Victoria, Royal Botanic Gardens: *Diuris palustris*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/ce8badcb-fed8-4b50-a26a-fde1a406cb2b>