

Cyperus concinnus Trim Flat-sedge

Taxonomy

Cyperus concinnus R. Br.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criterion B1ab(i,ii,iii,iv,v)

The bushfires of 2019/2020 are believed to have impacted the taxon's modelled habitat. However, the overall impacts of the fire are yet to be determined.

Species Information

Description and Life History

The taxon is a tufted perennial with very short rhizome. Culms trigonous, scabrous above, slightly swollen at base, 15-65 cm high, 1-3 mm diam. Leaves not septate-nodulose, shorter or a little longer than culms, 1-2 mm wide. Inflorescence compound with 3-5 primary branches to 4 cm long; digitate clusters to c. 1 cm diam.; involucre bracts leaf-like, 1-3 much exceeding inflorescence. Spikelets flattened, 1-6 per cluster, 4-10 mm long, 1.5-2.5 mm wide in side view, 12-32-flowered; rachilla not winged, persistent; glumes obtuse or almost acute, with sides not nerved, dark red-brown to blackish, c. 1.5 mm long; stamens 3. Nut trigonous, ellipsoid to ovoid, pale brown, less than half as long as glume, c. 0.5 mm long, c. 0.4 mm diam. The taxon flowers from spring to summer (VicFlora, 2019).

Generation Length

The generation length of *Cyperus concinnus* is estimated to be 15 to 40 years. The generation time is difficult to estimate since longevity, mortality and recruitment mode are uncertain. Longevity is plausibly 20-40 years. If drought and intense grazing by native herbivores resulted in mortality under pre-settlement conditions, then pulse recruitment is likely to have occurred following floods at a pre-settlement interval of 10-20 years or even 20-30 years.

Distribution

The taxon is rare in Victoria. It is known only from the Kerang-Pyramid Hill area, near Ballarat, and the Snowy River near Willis on the New South Wales. All mainland States (VicFlora, 2019).

The taxon was collected in the headwaters of the Loddon River in the vicinity of Creswick Creek in 1852 and 1853. In the absence of more recent collections the taxon is presumed to be locally extinct at this southern limit of distribution for the taxon. The taxon was collected at Sandy Creek near Suggan Buggan in 1971. It is unknown whether the taxon persists at this highly disjunct location which, at the time of collection, is likely to have been the southern limit of range for the taxon nationally. Aboriginal use of the plant for basket weaving may account for incidental dispersal to the Upper Loddon which is on a major aboriginal trade route between the northern and western plains. On the assumption that cultivation of floodplain taxa involved collection of tubers etc in woven baskets using, for example, *Cyperus gymnocaulos*, as recorded by Beth Gott, this provides a plausible explanation

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for the Mueller collections at Creswick Creek and accidental translocation by Aboriginals may even account for disjunct occurrences in eastern Victoria and southern New South Wales.

Habitat

The taxon is found in seasonally wet sites (VicFlora, 2019).

Threats

The taxon has experienced very significant historic decline through habitat loss to agriculture in the Wimmera. The habitat of the taxon, which occurs on Black Box Gilgai Plains, was widespread across the north-east Wimmera at the time of European settlement. An estimated 90% of this habitat has been cleared in the Kerang-Pyramid Hill district which is the stronghold of the taxon in Victoria. The floodplain habitat of the taxon is threatened by climatic drying and diversion of floodwaters for agriculture and town water supplies. The largest Victorian subpopulations are in Leaghur State Park where there is currently no environmental watering. Environmental water allocation could potentially restore or at least stabilise populations in the Leaghur State Park but such measures render the taxon conservation dependent which cannot guarantee the security of stands in the region. Weed invasion and competition are not implicated in the historic decline of the taxon.

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 style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (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:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 5,445 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas. The upper bound includes Beaglehole 1971 collection from Suggan Buggan in the Upper Snowy in East Gippsland. The lower bound excludes this highly disjunct record which has not been confirmed since 1971.

The taxon is estimated to be severely fragmented anthropogenically at the landscape scale, with all surviving occurrences isolated from each other at spacings exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal. If the taxon also survives at Suggan Buggan then the taxon is also severely fragmented naturally at the regional scale.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats.

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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 as Data Deficient

There is no available estimate of population size for the taxon.

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:

Eligible under criterion D2 as Vulnerable

The taxon is estimated to be very restricted.

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

References

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

VicFlora (2019) Flora of Victoria, Royal Botanic Gardens: *Cyperus concinnus*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/57380913-3aa1-485e-85ce-1aacbee8a30>