Threatened Species Assessment

Xanthorrhoea caespitosa
Tufted Grass-tree

Taxonomy

Xanthorrhoea caespitosa D.J. Bedford

This species has previously been regarded as a putative hybrid between *Xanthorrhoea australis* and *X. minor*. Plants of at least one of these two species are usually present near populations of *X. caespitosa* (VicFlora 2020).

At least some Victorian specimens from the Big Desert and Anglesea, initially identified as *X. semiplana* subsp. *semiplana*, have been redetermined as *X. caespitosa*.

In the absence of inflorescences, the distinction between the two taxa is difficult or impossible. *Xanthorrhoea caespitosa* has scapes longer than the flower spikes (the converse situation to that in *X. semiplana*), so some (or even all) records currently attributed to *X. semiplana* in Victoria may better be regarded as the more widespread *X. caespitosa*. The occurrence of *X. semiplana* in Victoria should probably be regarded as tentative pending careful field studies (VicFlora 2020).

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criteria A2ac+4ac; B2ab(ii,iii,iv,v)

Species Information

Description and Life History

Stem almost totally subterranean, branched underground. Leaves forming an uneven open tuft, depressed-obtriangular, sometimes concave above, 2.3-7.0 mm wide, 1-2 mm thick, grey, glaucous. Inflorescence with flower-bearing part 45-65 cm long, 22-28 mm diam., 0.3-0.5 times as long as non-flowering axis which is 90-120 cm long and 10.0-17.5 mm diam.; bracts around flowers prominent, narrow-triangular. Sepals with apex acute, without an adaxial projection; petals hairy in distal portion, with a large adaxial projection. Flowers October to December (VicFlora 2020).

Generation Length

The generation length of *Xanthorrhoea caespitosa* is estimated to be 100 to 150 years. Like all *Xanthorrhoea* taxa, this taxon is a very long-lived perennial arising from a deeply buried branched rootstock which resprouts following fire of any intensity or frequency. The taxon has little reliance on seed germination which is likely to occur episodically following intense fire events which promote mass flowering and seedset. Longevity is likely to be at least 150-200 years although the pre-settlement agents causing mortality are unknown. Unlike related taxa with aerial stems, which suffer some mortality through progressive erosion at the base of the caudex by intense fire, the stem of this taxon is almost totally subterranean and therefore well protected from fire.

Distribution

The taxon is scattered throughout south-western Victoria, with an isolated record near Cape Conran in the far east of the state. It also occurs in South Australia (VicFlora 2020). It extends discontinuously from the South Australian

border, from the Big Desert in the north to the Dergholm and Dartmoor districts in the south, east to the Grampians, with highly disjunct eastern outliers at Port Campbell in the Western Otways and at Anglesea in the Eastern Otways. The specimen record at Cape Conran is undoubtedly based on misidentification of *X. resinosa* which is common at the site (Cameron pers. obs.) and shares the elongated scape (1.5 m) in contrast to the relatively short spike (0.8 m).

Habitat

The taxon is associated with a range of heathland, heathy woodland and mallee communities where typically associated with *Allocasuarina mackliniana* (Western Sheoak), *A. misera* (Slender Sheoak), *A. muelleriana* (Slaty Sheoak), *Banksia ornata* (Desert Banksia), *Brachyloma daphnoides* (Daphne Heath), *Callitris verrucosa* (Scrub Cypress-pine), *Calytrix alpestris* (Snow Myrtle), *C. tetragona* (Common Fringe-myrtle), *Eucalyptus arenacea* (Desert Stringybark), *E. costata* (Yellow Mallee), *E. falciformis* (Western Peppermint), *E. leptophylla* (Slender-leaf Mallee), *Hakea mitchellii* (Desert Hakea), *H. rostrata* (Beaked Hakea), *H. rugosa* (Dwarf Hakea), *Hypolaena fastigiata* (Tassel Rope-rush), *Hysterobaeckea behrii* (Broom Baeckea), *Lepidobolus drapetocoleus* (Scale Shedder), *Lepidosperma viscidum* (Sticky Sword-sedge), *Leptospermum coriaceum* (Mallee Tea-tree), *L. myrsinoides* (Heath Tea-tree), *Melaleuca uncinata* (Broombush), *Monotoca scoparia* (Prickly Broom-heath), *Pteridium esculentum* (Austral Bracken), *Stenanthera conostephioides* (Flame Heath) or *Triodia scariosa* (Porcupine Grass). The taxon sometimes extends into damper woodlands, shrublands or sedgelands in swales or flats dominated by *Eucalyptus camaldulensis* (River Red-gum), *E. baxteri* (Brown Stringybark), *E. leucoxylon* subsp. *stephaniae* (Desert Yellow-gum), *E. obliqua* (Messmate Stringybark), *E. ovata* (Swamp Gum), *E. viminalis* subsp. *cygnetensis* (Rough-barked Manna-gum), *Acacia mearnsii* (Black Wattle), *Allocasuarina paludosa* (Scrub Sheoak), *Apodasmia brownii* (Coarse Twine-rush), *Banksia marginata* (Silver Banksia), *Baumea acuta* (Pale Twig-sedge), *B, juncea* (Bare Twig-sedge), *Callistemon rugulosus* (Scarlet Bottlebrush), *Chorizandra enodis* (Black Bristle-sedge), *Gahnia radula* (Thatch Saw-sedge), *Gymnoschoenus sphaerocephalus* (Button Grass), *Hibbertia sessiliflora* (Heathy Guinea-flower), *Lepidosperma carphoides* (Black Rapier-sedge), *L. congestum* (Clustered Sword-sedge), *L. longitudinale* (Pithy Sword-sedge), *L. semiteres* (Wire Rapier-sedge), *Leptocarpus tenax* (Slender Twine-rush), *Leptospermum continentale* (Prickly Tea-tree), *L. scoparium* (Manuka), *Lepyrodia muelleri* (Common Scale-rush), *Melaleuca brevifolia* (Mallee Honey-myrtle), *M. decussata* (Totem-poles), *M. gibbosa* (Slender Honey-myrtle) or *Microlaena stipoides* (Weeping Grass), sometimes associated with *Xanthorrhoea minor* subsp. *lutea* (Small Grass-tree) or, rarely, *X australis* (Austral Grass-tree).

Threats

The taxon has undoubtedly suffered significant historic decline through habitat loss to agriculture in the Western Wimmera, the South West, the outwash slopes of the Grampians and the margins of the Dundas Tableland. Agricultural intensification continues to threaten stands in remnant habitat throughout these districts with edge effects such as incremental habitat loss, wetland drainage, roadside and fire management activities, eutrophication and potential exposure to the pathogen *Phytophthora cinnamomi* through translocation of infected soil on vehicles and farm machinery.

Whilst many stands in these fragmented landscapes and sites on the periphery of extensive parks and other reserves already include a wide range of exotic weeds, weed invasion is not considered a significant current risk to established individuals since these individuals are typically quite massive, often locally common or dominant and highly competitive. Whilst seedling recruits may be subject to targeted herbivory by both native or exotic herbivores, this is not likely to be a significant current threat since established stands have little reliance on seed recruitment for their long-term persistence.Once established with a deeply buried rootstock, the taxon is well adapted to survive both fire of any intensity or frequency and drought stress. In the long term, however, extreme and prolonged drought stress may become a significant threat resulting in adult mortality and recruitment failure.

By analogy with other better-known taxa of *Xanthorrhoea*, the taxon is likely to be threatened by *Phytophthora cinnamomi* infection although this threat is likely to have differential impacts with stands in seasonally waterlogged sites likely to be at greater risk than those in well-drained sandy profiles. Mortality assignable to *Phytophthora* infection has not been commonly observed as is the case with *X. australis*.

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 Vulnerable

The population reduction over the past 300 to 450 years is estimated to be 30 to 50% (midpoint 40%), based on (a) and (c) above.

An estimate of past decline is based on historic habitat loss to agriculture.

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

Eligible under Criterion A4 as Vulnerable

The population reduction over any 300 to 450 year period, including both past and future (up to 100 years in the future), is projected to be 35 to 55% (midpoint 40%), based on (a) and (c) above. The causes of reduction may not have ceased, be understood or be reversible.

An estimate of future decline is based on the projected impact of the identified threats.

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 B2 as Vulnerable

The Area of Occupancy (AoO) across the taxon's range is estimated to be 550 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the regional and landscapes scales and anthropogenically at the landscape scale. The taxon may be dispersed by ants (myrmecochory) at the metre scale although most seed is likely to be committed to the seedbank within metres of the parent plant.

It is estimated to have 2 locations. It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats

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 50,000 to 75,000 mature individuals, which exceeds the thresholds for criterion C.

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:

Ineligible under Criterion D

It is estimated that there are 50,000 to 75,000 mature individuals.

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 Victoria: *Xanthorrhoea caespitosa*. Retrieved from https://vicflora.rbg.vic.gov.au/flora/taxon/15a968bf-9d08-4cda-ac88-2a71e42eadb0