

Carex capillacea Hair Sedge

Taxonomy

Carex capillacea Boott

Inflorescence a single spike as in *Carex cephalotes* and *C. archeri*, but the inflorescence more slender, with a longer male portion than in either of those species. *Carex capillacea* has in the past sometimes been treated as *Carex rara* subsp. *capillacea*. Nelmes considered *C. capillacea* to be distinct from *C. rara*, noting that the Australian and New Zealand plants match those from India closely (VicFlora, 2018).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a perennial herb with a short rhizome; shoots densely tufted. Culms erect, slender, terete to trigonous, smooth, 3-15(-30) cm long, c. 0.5 mm diam. Leaves usually shorter than culms, c. 0.5 mm wide; sheath green to pale brown; ligule obtuse. Inflorescence erect, 0.5-1 cm long, with 1 spike; lowest involucral bract shorter than inflorescence. Spike with male portion above and as long as female portion; glumes obtuse, orange-brown; female glumes 1.3-2 mm long; utricles 1.8-2.4 mm long, c. 1 mm diam., ovoid, strongly nerved, glabrous, pale brown, sometimes red-dotted; beak 0.2-0.5 mm long, with apex notched; style 3-fid. Nut ovoid, trigonous, pale brown, occasionally red-dotted. The taxon flowers in summer (VicFlora, 2018).

Generation Length

The generation length of *Carex capillacea* is estimated to be 25 to 40 years. This is based on a plausible longevity exceeding 40 years and the inference that vegetative resprouting is likely to be as important as seed-based recruitment for population maintenance under pre-settlement conditions. The pre-settlement fire interval was probably in the 50-100 year range, with fire affecting only a mosaic proportion of plants at any one site. Seed-based recruitment is likely to be opportunistic in response to localised site disturbance events and seasonal conditions.

Distribution

The taxon is restricted in Victoria to the Alpine region where it is rather uncommon (e.g., on the Snowy Range, Bogong High Plains, Nunniong Plateau, Davies Plain and the Cobberas). It also occurs in New South Wales, Australian Capital Territory, Tasmania, New Zealand and Asia to India (VicFlora, 2018).

Habitat

The taxon is scattered in alpine areas, bordering high-altitude swamps and wet alpine heathlands, where it is usually associated with *Sphagnum* moss, but rather uncommon (VicFlora, 2018). Site and specimen data indicate that it is typically associated with *Agrostis muelleriana* (Mueller's Bent), *Baeckea gunniana* (Alpine Baeckea),

Balaskion australe (Mountain Cord-rush), *Baumea gunnii* (Slender Twig-sedge), *Blechnum penna-marina* subsp. *alpina* (Alpine Water-fern), *Callistemon ptyoides* (Alpine Bottlebrush), *Carex appressa* (Tall Sedge), *Carex gaudichaudiana* (Fen Sedge), *Empodisma minus* (Spreading Rope-rush), *Epacris breviflora* (Drumstick Heath), *Epacris celata* (Cryptic Heath), *Epacris gunnii* (Ace of Spades), *Epacris paludosa* (Swamp Heath), *Epilobium curtisiae* (Bald-seeded Willow-herb), *Epilobium gunnianum* (Gunn's Willow-herb), *Eucalyptus stellulata* (Black Sallee), *Gonocarpus micranthus* (Creeping Raspwort), *Hakea microcarpa* (Small-fruit Hakea), *Hookerchloa hookeriana* (Hooker's Fescue), *Hypericum japonicum* (Matted St John's Wort), *Juncus falcatus* (Sickle-leaf Rush), *Leptospermum grandifolium* (Mountain Tea-tree), *Oreomyrrhis ciliata* (Fringed Caraway), *Ozothamnus cupressoides* (Kerosene Bush), *Poa clivicola* (Fine-leaf Snow-grass), *Poa costiniana* (Bog Snow-grass), *Poa hiemata* (Soft Snow-grass), *Ranunculus amphitrichus* (Small River Buttercup), *Ranunculus pimpinellifolius* (Bog Buttercup), *Richea continentis* (Candle Heath) and *Sphagnum cristatum* (Peat Moss).

Threats

Alpine grazing of cattle on the Snowy Range, Bogong High Plains and the Nunniong Plateau has been a major historic threat resulting in widespread destruction of wetland habitats and facilitating exotic weed invasion. At many sites, the taxon has been observed to be heavily trampled and severely pugged by cattle. The frequent association with *Carex gaudichaudiana* (Fen Sedge), which is targeted by cattle, and with *Sphagnum cristatum* (Peat Moss), which is highly susceptible to trampling and pugging, emphasise the vulnerability of the habitat of the taxon to cattle grazing.

Although the direct impact of cattle grazing ceased with the cancellation of grazing licences throughout the Alpine National Park, with a likely recovery of the population and its habitat, the legacy of weed invasion persists.

Occurrences on the Nunniong Plateau continue to be threatened by cattle grazing. Occurrences on the Cobberas and the Nunniong Plateau and, to a lesser degree, those further west, are increasingly threatened by feral horses with similar impacts on the fragile wetland habitat of the taxon to those of cattle.

The key current and future threat to the taxon is the long-term impact of climatic drying, coupled with increasing temperatures that lead to shrub invasion of subalpine to alpine wet heath or bog communities. Such invasion is exacerbated by imposed anthropogenic and climate-induced increases in fire frequency, intensity and landscape scale.

The taxon is increasingly threatened also by Sambar Deer which, in recent years, have been observed within the habitat of the taxon across the Alpine region where their pugging and wallowing behaviour is highly destructive. It also continues to be threatened by weed invasion, facilitated by cattle grazing on the Nunniong Plateau and increasingly throughout its range by horses and Sambar.

The bushfires of 2019/2020 are believed to have impacted around 10% of the taxon's habitat. The overall impacts of the fire are yet to be determined, and its recovery depends on the effective control of the impacts of feral herbivores and prevention of major soil and vegetation disturbance as a result of fire recovery activities.

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:

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.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 176 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 subregional and landscape scales with all geographically isolated stands occurring at separations likely to exceed the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. Seed-bearing utricles are likely to be dispersed downstream by water within each catchment unit.

It is estimated to have 2 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above due to 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 as Data Deficient

There is no longitudinal population monitoring data to inform a reliable estimate of current population size.

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 (2018). Flora of Victoria, Royal Botanic Gardens: *Carex capillacea*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/ffa6ea54-ce72-4c1c-9eed-d379343540b0>