Threatened Species Assessment

Celmisia latifolia
Victorian Snow-daisy

Taxonomy

Celmisia latifolia (F. Muell. ex Benth.) M. Gray & Given

This very distinctive taxon is the largest in Australia and appears to be closely related to the New Zealand endemic *C. hookeri* Cockayne (VicFlora 2019). In some instances, it may be difficult to separate *C. latifolia* from some other *Celmisia* taxa, as leaf length and width can vary substantially. Indeed, all Victorian *Celmisia* taxa except for *C. sericophyllla* were once combined as *C. asteliifolia.*

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is branched, erect, woody with tough rootstock. Leaves oblanceolate to narrowly oblanceolate or elliptic, loosely cylindrically folded when young, (12-)18-26 cm long, 1.5-3(-5) cm wide, grey-green above with thin, lustrous, more or less deciduous pellicle, tomentum beneath dense, compact, satiny, hairs terete (under high magnification), covered by a very thin, silvery pellicle which soon breaks up into microscopic hair-like fragments, midrib obscure, margins flat or only slightly recurved. Scape woolly-tomentose but often sparser than in other species, 28-45 cm high; capitulum c. 5-7 cm diam.; intermediate involucral bracts narrowly triangular-acuminate, c. 14-20 mm long, c. 2.5 mm wide, glabrescent to tomentose with long webby hairs, tips flushed reddish-purple, margins long-fimbriate; ligules 18-25 mm long, white. Cypselas c. 6-12 mm long, with short, appressed antrorse hairs; pappus 4-9 mm long. Flowers December-February (VicFlora 2019).

Generation Length

The generation length of *Celmisia latifolia* is inferred to be 20 to 60 years. The Vital Attribute database suggests that *C. latifolia* recovers post-fire from both a long-lived soil seedbank, although post-fire germination appears delayed, and vegetatively from protected buds. Fire is historically rare in alpine areas, occurring perhaps once or twice a century, and plants are likely to live to a long age. In undisturbed vegetation, the average age of plants is likely to be towards the older end of the range, reflecting recruitment pulses and ongoing recruitment.

The taxon is also tolerant of establishment in mature vegetation. The seedlings take 1 year to reach reproductive capacity, individual plants live 50+ years, and seeds survive in the soil for 50+ years.

Distribution

The taxon is endemic in Victoria, and is mainly restricted to the Snowy Range from Mt Wellington north to Mt Cobbler, with short extensions west to Mt Buller and environs, and east along the Barry Mountains toward Mt Hotham (Gray and Given 1999).

The largest occurrences are in the Buller/Howitt/Moroka region and only a small part of its distribution is on the Bogong High Plains.

Habitat

The taxon is confined to higher subalpine meadows, margins of wet heaths and Snow Gum woodlands. It sometimes forms pure stands up to c. 10 m diameter (VicFlora 2019). The habitat coincides with vegetation types preferentially grazed by cattle and horses, such as subalpine tract; Snow Gum woodlands, herbfields, heaths, and margins of bogs (Gray and Given 1999). Bioregions include Highlands-Southern Fall, Highlands-Northern Fall, and the Victorian Alps.

Threats

van Rees (1984) showed that *C. asteliifolia* (later spilt into *C. costiniana, C. pugioniformis* & *C. tomentella*) was preferentially grazed by cattle, making up a large part of their diet. Grazing has ceased in some areas which has clearly had a substantial impact on the taxon, with the plant cover of *Celmisia* spp. increasing from 5% to 44% after 47 years without grazing (Wahren et al. 1994). However, the taxon is still subject to grazing in some of its range, and feral horses and deer are still active on the Bogong High Plains and around Cobungra State Forest to the south. In addition, the most westerly population, near the summit of Mt Buller, must be regarded as seriously threatened due to over-development of skiing facilities on this mountain (Gray and Given 1999).

Alpine taxa are prone to range contraction due to climate change of which the impacts, particularly in wetter habitats, are likely to be seen first in marginal, lower-elevation subpopulations. It is expected, however, that the population will be relatively stable for the next 40-60 years as recovery from grazing cancels out other detrimental impacts such as climate change, feral horses, and deer.

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 Endangered

The population reduction over the past 60 to 180 years is estimated to be 30 to 50%, based on (c) and (e) above.

Past decline is based on the taxon being preferentially grazed by cattle, which has had a substantial impact on plant cover. Alpine bogs have also decreased substantially since settlement, with anecdotal evidence suggesting up to a 50% decrease in the area of bogs. The reduction in population size since settlement is difficult to estimate but is conservatively likely to have been around 50%.

The causes of the 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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 3,749 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented since wind dispersal is limited and hence there is no realistic capacity for recolonisation in the event of local extinction. Fragmentation is of most concern for small outlying subpopulations, especially for lower-elevation areas that are already marginal habitat. Indeed, *C. latifolia* is comprised of mostly small subpopulations.

It is estimated to have 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the impacts of herbivory, climate change and increased fires.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 76 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 3 locations, 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:

Ineligible under Criterion C

It is suspected that there are 6,000 to 10,000 mature individuals, but this qualifier is too weak and other thresholds under this criterion have not been met.

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 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. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

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