



## *Craspedia maxgrayi* Woolly Billy-buttons

### Taxonomy

*Craspedia maxgrayi* J. Everett & Joy Thomps.

Plants with grey, woolly hairs on some leaves or on parts of leaves (especially the midrib) are common in the Mt Nelse-Spion Kopje area in Victoria (less common on Mt Hotham, Mt McKay and Mt Buffalo). Similar plants occur on slopes of Mt Jagungal in New South Wales. They are perhaps of hybrid origin, the indumentum on their leaves being highly variable. Putative parents for these hybrids are *C. lamicola*, *C. adenophora*, *C. maxgrayi* and *C. coolaminica*. The flower colour may be yellow or orange (McDougall and Walsh 2008).

### 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(iii)

### Species Information

#### Description and Life History

Robust herb with 1 or 2 flowering scapes 30-50cm high; roots thick, tomentose. Leaves basal and cauline, narrowly spatulate to oblanceolate, obtuse; basal leaves 10-15cm long, 1.5-3cm wide, with one conspicuous vein, surfaces silvery with appressed silky or cottony eglandular hairs. Inflorescence golden-yellow, c. spherical, 2.5-4cm diam., with 70-120 capitula; scape pale, densely silky or cottony. Capitula with 9-11 florets; bract subtending capitulum broadly ovate, lower margins narrowly to broadly membranous, dark brown or colourless, upper margins and tip not or scarcely membranous, stereome ovate, minutely glandular, base with silky hairs. Cypselas 1-2mm long; pappus 3-5mm long. The taxon flowers in the Summer (VicFlora 2019).

#### Generation Length

The generation length of *Craspedia maxgrayi* is estimated to be 30 to 60 years. This is based on an estimated longevity of at least 3 decades, and plausibly exceeding 50 years. It is also based on a low rate of continuous recruitment in response to localised disturbances, such as Case Moth attack of *Poa hiemata* and possibly *P. costiniana* tussocks resulting in gap creation. Rare fire events also create gaps, potentially promoting some episodic recruitment, although most *Craspedias* resprout readily post-fire. Pre-settlement fire intervals are likely to have been in the 60-150 year range.

#### Distribution

The taxon is common on the Main Range of Kosciuszko National Park in New South Wales (NSW). Outside the Main Range, it appears to occur only on the Mt Bogong plateau in Victoria, where it is rare (McDougall and Walsh 2008). The status of plants at Mt Hotham is unclear since McDougall and Walsh (2008) suggest they are of hybrid origin with *C. maxgreyi*, a possible parent. VicFlora (2019), by contrast, suggests true *C. maxgrayi* occurs in the Mt Hotham area. The Australian Virtual Herbarium (AVH) includes specimens determined as *C. maxgrayi* by Neville Walsh from Mt Loch. The AVH also includes specimens determined as *C. maxgrayi* by Joy Everett (who described

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the taxon with Joy Thompson in 1992) from Mt Buller, Mt Buffalo, Mt Hotham, Mt McKay, and the Pretty Valley pondage at Falls Creek.

## Habitat

The taxon is apparently restricted in Victoria to alpine grassland and herbfield, usually in drier sites (VicFlora 2019). On the Main Range of Kosciuszko National Park it can be found in grassland and open heath, generally above the treeline. On the Hooker Plateau near Mt Bogong, the taxon is recorded in low open shrubland with *Grevillea australis*, *Asterolasia trymalioides*, *Kunzea muelleri*, *Poa hiemata* and *Acrothamnus montanus*, where it is locally common at an elevation of 1950 m. At the wet end of the Mt Bogong summit area, the taxon is recorded in tall herbfield grassland, in association with *Celmisia* taxa. At Mt Loch the taxon is recorded in grassland dominated by *Poa costiniana*, at an elevation of 1840 m.

## Threats

The taxon may have suffered significant historic decline in response to high rates of stock grazing, sustained over the period 1890-1950. This is demonstrated for *Craspedias* in general, in stock exclusion plots established on the Bogong High Plains. *Craspedia* taxa are palatable to cattle and are much more common within cattle grazing exclosures established on the Bogong High Plains than outside. The recent removal of grazing from the Victorian high country will possibly facilitate its recovery, which appears to have occurred for the similar *C. lamicola* in Kosciuszko National Park in NSW (McDougall and Walsh 2008).

The key current and projected threat to the taxon is climatic drying and warming which, together with increasing frequency and intensity of fire, is projected to promote shrub encroachment into the grassland and open heathland habitat of the taxon. The intensity of this threat may be mitigated, however, by the observation that high-country *Craspedias* are generally drought tolerant and limited more by competition, which can be relieved by both drought and fire. Some stands, such as at Mt Loch and at Mt Hotham (if correctly determined), may be subjected to the impact of ski field management 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>			

## Evidence:

### Eligible under Criterion A3 as Endangered

The population reduction over the next 90 to 100 years is projected to be 50 to 75%, based on (c) and (e) above.

This is based on the projected impacts of the identified current and future threats.

### Eligible under Criterion A4 as Endangered

The population reduction over any 90 to 180 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 75% (midpoint 50%), based on (c) and (e) above.

Past decline cannot be estimated with any confidence since there is no monitoring data to indicate whether the taxon suffered significant historic decline in response to cattle grazing, or whether the taxon recovered following cancellation of grazing licences throughout the Alpine National Park. Stock were excluded from the Mt Loch area in the late 1950s-1960s. Sites east and north of the Rocky Valley storage, such as Watchbed Creek and Heathy Spur, were excluded from stock grazing in 1991-1992. Other sites on the Bogong High Plains were released from grazing in 2003. The net impact of past decline and subsequent recovery is unknown.

Some stands may have been affected by ski field development and infrastructure maintenance, although the net impact of slashing and grooming is unclear.

Future decline is based on the projected impacts of the identified current and future 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 (EEO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 79 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the landscape scale. Geographically isolated stands occur at spacings likely to exceed the dispersal range of the taxon, which is likely to be wind-dispersed at the 100m-1km scale. This precludes the possibility of recolonisation in the event of local extinction

It is estimated to have 1 location, and has a continuing decline in (iii) above due to the identified threats.

### Eligible under Criterion B2 as Endangered

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The Area of Occupancy (AoO) across the taxon's range is estimated to be 16 km<sup>2</sup>, based on accepted, post-1970 records from the VBA. As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (iii) 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 as Data Deficient

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

Criterion-D. Very small or restricted population <sup>⊠</sup>		Critically Endangered <sup>⊠</sup>	Endangered <sup>⊠</sup>	Vulnerable <sup>⊠</sup>
Number of mature individuals (observed or estimated) <sup>⊠</sup>		< 50 <sup>⊠</sup>	< 250 <sup>⊠</sup>	< 1,000 <sup>⊠</sup>
D2. Only applies to the VU category <sup>⊠</sup> 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. <sup>⊠</sup>		- <sup>⊠</sup>	- <sup>⊠</sup>	D2. Typically: <sup>⊠</sup> AoO < 20 km <sup>2</sup> or number of locations ≤ 5 <sup>⊠</sup>

## 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.



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McDougall, K.L., and Walsh, N.G. (2008). A conspectus of high-country *Craspedia* (Asteraceae: Gnaphalieae) of mainland south-eastern Australia. *Muelleria*, 26(2), 3-10.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Craspedia maxgrayi*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/4905aa1c-8874-4ec1-bb89-6e0016991177>