



## *Calotis lappulacea* Yellow Burr-daisy

### Taxonomy

*Calotis lappulacea* Benth.

### Current conservation status

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

### Proposed conservation status

Vulnerable in Victoria

Criterion D2

### Species Information

#### Description and Life History

Slender, erect or straggling, much-branched perennial, 20-50 cm high; stems and leaves sparsely hirsute to strigose. Leaves sessile, oblong to narrow-obovate, 4-20 mm long, 1-4 mm wide, entire, distally toothed, or rarely, pinnatifid. Capitula 3-8 mm diam.; involucral bracts oblong, 2.5-4 mm long; ray florets c. 40-60, yellow, 2-4 mm long; disc florets sterile. Cypsela body c. 1.5 mm long, tuberculate (occasionally the tubercles coalescing to form irregular lateral ridges), pale to reddish-brown; major awns 2, diverging at right-angles to plane of cypsela faces, 1-2 mm long, barbed near apex; secondary awns (to 0.5 mm long), above one angle of cypsela, basally united in a group of 3-6, with usually a single awn above the opposite angle. The taxon flowers mostly from September to January (VicFlora 2018).

#### Generation Length

The generation length of *Calotis lappulacea* is estimated to be 10 to 25 years. This is based on an estimated longevity, which may not exceed 10 years. It is also based on the likelihood that the taxon recruits episodically in response to good rainfall events at pre-settlement intervals driven by La Niña cycles. The taxon is less likely to be cued by fire than the related *C. cymbacantha*, or by sand blowouts or other localised site disturbance events than the related *C. erinacea*.

#### Distribution

The taxon is scattered in the east at Deddick, Suggan Buggan, Tabberabbera, and Glenaladale, and is rare near Melbourne at Toolern Vale, the northern end of the Brisbane Ranges, and in the north and north-west in the Picola and Chinkapook districts. It is also found in Western Australia, South Australia, Queensland, New South Wales and the Australian Capital Territory (VicFlora 2018).

#### Habitat

The taxon is scattered in dry, rocky country in the east, and in open woodland near Melbourne. It is also found on fertile, loam or clay soils in the north and north-west (VicFlora 2018).

#### Threats

The taxon has undoubtedly suffered significant historic decline through habitat loss for agriculture in some districts, and habitat degradation in response to fragmentation and exposure to edge effects in rural landscapes.

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Many sites in fragmented rural landscapes continue to be threatened by a wide range of site-specific threats, including roadworks, agricultural intensification and other edge effects resulting in incremental habitat loss and degradation. However, specimen collectors note that there has presumably been an occasional introduction when the taxon was collected on a weedy roadside in the Melbourne suburb of Footscray. Collectors also noted a casual introduction when only a single plant was collected beside the Murray Valley Highway at Vinifera. Collections are often sporadic, on roadsides, and often there are only single or a few plants noted. This is suggestive of weedy, opportunist behaviour, and that the taxon has demonstrated resilience under at least a range of habitat degradation impacts in fragmented rural landscapes.

Although the taxon is subject to a range of plausible threats, operating differentially in different landscapes across the very wide geographic Victorian range of the taxon, a key threat operating consistently across all regions is intense herbivory. This is particularly threatening during periods of prolonged drought, with compromised seedbank replenishment and subsequent risk of seedbank exhaustion and recruitment failure. Cunningham et al. (1992) note that the taxon is quite palatable and is usually regarded as useful feed by pastoralists in western New South Wales. Climatic drying and warming are expected to exacerbate the risk of intense herbivory by native and exotic herbivores, as well as increase the risk of recruitment failure in response to extreme drought stress.

## 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"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## 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 <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:

### Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range, based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA), is estimated to be 109,713 km<sup>2</sup> which exceeds the threshold for criterion B.

The Area of Occupancy (AoO) across the taxon's range, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA, is estimated to be 124 km<sup>2</sup> but other thresholds under this criterion have not been met.

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				

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## Evidence:

### Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals.

Criterion D - Very small or restricted population <sup>Ⓜ</sup>			
<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. The number of locations is estimated to be 2 to 4, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within one or two generations in response to the identified threats.

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

## References

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L., and Leigh, J.H. (1992). *Plants of Western New South Wales*. Collingwood, Victoria: CSIRO Publishing.

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 Victoria: *Calotis lappulacea*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/8eaf3841-de79-494b-bba1-6daf33ab9e71>