# Threatened Species Assessment

## *Olearia pannosa* subsp. *cardiophylla*
## Velvet Daisy-bush

### Taxonomy

*Olearia pannosa* subsp. *cardiophylla* (F. Muell.) D.A. Cooke

This subspecies possibly warrants recognition at species rank, but no combination currently exists for it within *Olearia.* The typical subspecies is confined to South Australia (VicFlora 2016).

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1995).

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

### Proposed conservation status

Endangered in Victoria

Criteria A2bce+3ce+4bce; B2ab(i,ii,iii,iv,v); C1

### Species Information

#### Description and Life History

The taxon is a spreading, tuberous-rooted shrub to c. 1 m high; branchlets and leaf undersurfaces buff-coloured, woolly with Y-shaped hairs. Leaves alternate, ovate or cordate, 30-120 mm long, 18-65 mm wide, obtuse, flat, upper surface green, finally glabrous or remaining woolly about the midrib, with impressed reticulate venation; broadly obtuse, truncate or cordate at base; petiole to c. 22 m long. Capitula 35-75 mm diam., terminal and solitary; peduncles c. 5-25 cm long; involucre hemispherical, 15-21 mm long; bracts 3-6-seriate, graduating, woolly. Ray florets 8-18, white, ligules 18-45 mm long; disc florets c. 30-60, yellow. Cypsela cylindric, 8-10-ribbed, 5-8 mm long, pubescent, often reddish; pappus bristles pale to rusty, 8-10 mm long. Flowers September-November (VicFlora 2016).

It is a large shrub that can spread over 10-20 metres, and regeneration from seed is rare. Like plants that sucker from their roots, *O. pannosa* also sends up new shoots at a distance, except that its shoots are actually coming from decumbent stems that have been covered by plant litter, soil and rubble.

#### Generation Length

The generation length of *Olearia pannosa* subsp. *cardiophylla* is estimated to be 50 to 150 years. The taxon is a suckering shrub that is able to resprout.

#### Distribution

The taxon is rare in Victoria, known near Wedderburn, Rushworth, the Brisbane Ranges, and Anglesea (VicFlora 2016).

#### Habitat

The taxon is known from dry open-forest, on shallow rocky soils near Wedderburn, Rushworth, and in the Brisbane Ranges, and in coastal woodland near Anglesea (VicFlora 2016).

### Threats

According to DSE (2003), the known subpopulations of Velvet Daisy-bush are widely dispersed, and many comprise very few plants, which may affect genetic vigour. Any single threat can endanger the survival of an entire subpopulation.

Threats to this taxon include grazing by native herbivores, rabbits, and domestic stock, and plants within the Sheoaks and Brisbane Ranges National Park areas have been severely grazed by kangaroos and wallabies. Other threats include inappropriate fire regimes, altered nutrient and soil moisture levels, land clearing, erosion, weed competition (although sites in the Brisbane Ranges National Park and Steiglitz Historic Park are isolated, so weed competition is of minimal threat), rubbish dumping, herbicide use, residential development, and Cinnamon Fungus (*Phytophthora cinnamoni)* infection.

Fruit damage due to insect predation is common, and normal low seed-set also poses a threat to populations (Bartley pers. comm.). The Velvet Daisy-bush is at most risk through its extremely slow growth rate, variable seed production, low seed viability (Smith 2002), and small dispersal range. The location of many populations along roadsides poses problems to the plants' ability to reproduce due to the thin linear nature of road reserves and the potential of the soil and ground being disturbed through road works. The Velvet Daisy-bush occurs with other rare plants in the Brisbane Ranges National Park and surrounds, and tends to be located in intact vegetation. As most populations are in areas largely devoid of human or animal disturbance, survival rates appear to be high.

The response of populations to fire is not understood and will need to be investigated to enable suitable management regimes to be adopted.

## 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 150 to 450 years is estimated to be 30 to 70%, based on (b), (c) and (e) above.

Collection records suggest that five subpopulations may be extinct; these include subpopulations on the Campaspe near Axedale, Anglesea, Mount Ida, Geelong, and Mount Buffalo. The location of these past and extant subpopulations in often fragmented and unprotected landscapes points to significant past habitat loss, however the wide range reflects lack of knowledge of past distribution and numbers.

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

**Eligible under Criterion A3 as Endangered**

The population reduction over the next 100 years is suspected to be 30 to 70%, based on (c) and (e) above.

Although the three largest extant subpopulations (Brisbane Ranges, Point Addis, and Rushworth) are in relatively less fragmented landscapes, they are mostly unprotected and still vulnerable to threats due to their small extent and a lack of seedling regeneration, especially in the context of climate change. The estimated wide range reflects uncertainty and lack of knowledge about the taxon's basic ecology.

**Eligible under Criterion A4 as Endangered**

The population reduction over any 150 to 450-year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 70%, based on (b), (c) and (e) above. 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 Vulnerable**

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 15,942 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally, and has been fragmented further since settlement. This is also due to its dispersal ability, the barriers to dispersal, and lack of habitat separating individuals.

It has a continuing decline in (i), (ii), (iii), (iv), and (v) above, due to the impacts of the identified threats.

**Eligible under Criterion B2 as Endangered**

The Area of Occupancy (AoO) across the taxon's range is estimated to be 124 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented, 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:

**Eligible under Criterion C1 as Endangered**

It is estimated that there are 2,050 to 6,060 individuals, and a continuing decline of 30 to 70% is estimated to occur within 2 generations.

The current population is based on the collation of estimates across sites in all five subpopulations. The wide range reflects the uncertainty around numbers due to inconsistency with methods discerning between genets and ramets.

| 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<br>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 D 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.

DSE (2003). Action Statement - *Olearia pannosa* subsp. *cardiophylla* Velvet Daisy-bush (No. 189). Department of Sustainability and Environment, Victoria. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0022/32692/Velvet_Daisy_Bush_Olearia_pannosa-cardiophylla.pdf

SAC (1995). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 341 *Olearia pannosa* ssp. *cardiophylla*

Smith, Z. (2002). *Morphological and genetic variation within the rare daisy Olearia pannosa* Hook. subsp. *cardiophylla (*F. Muell.) D.A. Cooke. Honours Thesis, School of Botany, The University of Melbourne.

VicFlora (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Olearia pannosa* subsp. *cardiophylla*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/95c7be76-c6db-4373-aa1c-e37824ff43f2