FLORA & FAUNA GUARANTEE

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

***Olearia ramulosa var. tomentosa* –** Twiggy Daisy-bush

DOCID107-417469679-742

Date of receipt of nomination: 25 May 2023

Date of preliminary recommendation: 7 November 2024

Date of final recommendation decision: 10 February 2025.

Validity: The nomination is for a valid item.

Prescribed Information: The prescribed information was provided.

Name of the Nominator is adequately provided

Name of the Item is adequately provided

The nominated taxon is accepted by the Scientific Advisory Committee (SAC) as a valid taxon because it has been formally described and is accepted as a valid taxon by the Royal Botanic Gardens Victoria.

Current conservation status

The nominated taxon is not currently listed as threatened in Victoria, in another state or federally.

Eligibility for listing as a taxon under the Flora and Fauna Guarantee Act 1988

The SAC has assessed the eligibility of this nomination based on its extinction risk within Victoria in accordance with Section 16C(4)(c) of the *Flora and Fauna Guarantee Act 1988* (FFG Act) and the criteria for determining eligibility for listing prescribed in the Flora and Fauna Guarantee Regulations 2020 (FFG Regulations). In its application of the relevant eligibility criteria, the SAC has, as required by the nationally adopted Common Assessment Method, had regard to the *IUCN Red List Categories and Criteria (Version 3.1)* (IUCN 2012) and the *Guidelines for Using the IUCN Red List Categories and Criteria (version 16)* (IUCN Standards and Petitions Committee 2024).

Species information

Description

Twiggy Daisy-bush is a small shrub, 0.3-1.5 m high, branches usually with sessile glands and short setae (to 0.75 mm long) and covered with dense woolly hair. Leaves linear, 5-13 mm long, 0.5-1.5 mm wide; margins strongly recurved; upper surface glabrous, scabrous, sometimes sparsely woolly and or glandular; lower surface with long spreading woolly hair extruding from within the recurved leaf margins. Capitula axillary, sessile, often forming a spicate conflorescence along the stem; bracts acute, 3-5 mm long, tomentose, sometimes glandular. Ray florets are white (VicFlora 2016).

Life history

Twiggy Daisy-bush flowers from September to January (VicFlora 2016) and is almost certainly insect pollinated (Hingston and McQuillan 2000). Elsewhere in Victoria and NSW the species *O. ramulosa* is known to form soil seeds banks and is considered

a post-fire pioneer (Molnar et al. 1989; Penman et al. 2008). However, recruitment by seed and the circumstances in which it happens have not been specifically observed for *O. ramulosa* var. *tomentosa*, and so any estimates about the periodicity of seedling recruitment would be speculative. Field observations of the only known extant occurrences and of plants cultivated *ex situ* indicate that the taxon persists through root-suckering and layering to form dense clonal copses. Suckering is reported to occur in response to disturbance such as browsing, and copses may persist for decades. These observations suggest generation length is indefinite and that ramet mortality may only occur in response to extremely rare climatic events or gross localised disturbance events which are likely to have been stochastic in nature. Given the lack of detailed information and confidence in generation length estimates, this assessment is based on criteria that do not require an estimate of generation length.

Distribution
Twiggy Daisy-bush is now restricted to the Nillumbik Shire area north-east of Melbourne, on the lands of the Wurundjeri People. Historic records from the Campaspe River and the Loddon and Strathbogie Ranges suggest it was once more widespread (VicFlora 2016).

Current
In the Melbourne region, Twiggy Daisy-bush is currently known from two occurrences approx. 6 km apart. The Panton Hill stand occurs on Red Shirt Gully Road, north-west of Kangaroo Ground - St Andrews Road. The Christmas Hills stand occurs in a fenced enclosure north-west of the intersection of Beardsell and Rosella Tracks in the One Tree Hill Reserve within the Warrandyte-Kinglake Nature Conservation Reserve.

There is an unvouchered site record from 1997 in the Victorian Biodiversity Atlas (VBA), approximately 150 km north-east of the Melbourne records. This site is east of Dandongadale on the lands of the Taungurung People, in State Forest on an SEC Access Track. Although the identity of this record requires confirmation, Cam Beardsell (personal communication, 11 September 2024) is confident of his determination, having been familiar with the taxon in the Panton Hill district at the time. Given that the occurrence occupied only 5-10 m^2 and is likely to have represented a single clonal individual, the persistence of this occurrence cannot be guaranteed but is considered as extant for this assessment.

The VBA also includes an unvouchered 2010 site record on Morrisons Track in Eltham South. This occurrence is a translocation established in 2005 (Cam Beardsell personal communication, 11 September 2024). The translocation comprises a single clonal patch occupying approximately 0.5 m^2. It is not spreading, is not self-sustaining and does not meet the IUCN guidelines for inclusion as a sub-population.

Historic
Blandowski collected the taxon at Mt McIvor in the second half of the nineteenth century and Williamson collected the taxon at Strathbogie in 1903. There is also an undated collection from the Loddon Ranges in the Sonder Herbarium. Since Sonder died in 1881 this collection is assumed to predate 1881. The type locality at Mt McIvor is assumed to refer to the McIvor gold diggings in the Heathcote district in North Central Victoria. In the absence of recent confirmation, the taxon is presumed extinct at these historic collection sites.

In 1987, two Twiggy Daisy-bush individuals were recorded on freehold land on Bailey Gully Road in Wattle Glen. The site was subsequently developed for residential housing, and in the absence of further monitoring, this small, isolated occurrence is likely to have gone locally extinct in the last 36 years.

Other
There is also an unvouchered 2022 site record in the VBA from Eastern View near Aireys Inlet. This record is considered a misidentification and likely to represent one of the numerous forms of *Olearia ramulosa* currently included within *Olearia ramulosa* var. *ramulosa* (Cam Beardsell and David Cameron personal communication, 17 September 2024).

Habitat
In the area north-east of Melbourne, Twiggy Daisy-bush is restricted to dry open woodland on shallow soils at altitudes of 150 m to 350 m (VicFlora 2016). The Panton Hill stand is in Grassy Dry Forest dominated by *Eucalyptus goniocalyx* subsp. *goniocalyx* (Bundy or Long-leaf Box), *E. macrorhyncha* (Red Stringybark) and *E. polyanthemos* subsp. *vestita* (Red Box) in association with *Acacia mearnsii* (Black Wattle), *Dianella admixta* (Black-anther Flax-lily), *Exocarpos cupressiformis* (Cherry Ballart), *Rytidosperma fulvum* (Copper-awned Wallaby-grass) and *R. pallidum* (Silvertop Wallaby-grass) on shallow clay loam soil over Ordovician sediments. The Christmas Hills stand is likewise in Grassy Dry Forest, whereas the Dandongadale site is Heathy Dry Forest dominated by *Eucalyptus dives* (Broad-leaf Peppermint), Bundy and Red Stringybark, in association with

A. dealbata (Silver Wattle), Cherry Ballart and *Pultenaea spinosa* (Grey Bush-pea). At Wattle Glen the taxon was recorded in association with Red Box, Cherry Ballart, disjunct occurrences of *Calotis scabiosifolia* var. *integrifolia* (Rough Burr-daisy) and *Olearia teretifolia* (Cypress Daisy-bush), and the threatened species *Billardiera scandens* (Velvet Apple-berry) and *Caladenia amoena* (Charming Spider-orchid).

Threats
Twiggy Daisy-bush is likely to have suffered significant historic decline in response to habitat loss to agriculture in all districts, and to habitat degradation in response to gold mining activity, stock grazing, targeted browsing by rabbits, kangaroos, wallabies and deer, imposition of unfavourable fire regimes and by weed invasion. Current and future threats include climatic drying and warming, increasing frequency and intensity of both wildfires and fuel reduction burns, targeted browsing by Sambar (*Cervus unicolor*), rabbits, kangaroos and wallabies, road and track maintenance and weed invasion.

Historical disturbance at One Tree Hill has left some areas dominated by stands of *Kunzea leptospermoides* (Yarra Burgan). There is potential for Yarra Burgan regrowth to supress Twiggy Daisy-bush or make areas of its habitat unsuitable for recruitment. Past management has also involved mechanical thinning of Yarra Burgan which may or may not benefit Twiggy Daisy-bush.

The Panton Hill stand extends from a road reserve managed by Nillumbik Shire Council onto freehold land at the top of a cutting. There is a risk of ramet loss by boundary fence management, permitted clearance of native vegetation and erosion. Many of the larger ramets at this site are protected from browsing by individual wire guards, but smaller, unfenced ramets are vulnerable to heavy browsing especially by native macropods and Sambar.

The Christmas Hills stand occurs in One Tree Hill Reserve within the Warrandyte-Kinglake Nature Conservation Reserve and is better protected - all ramets occur within an herbivore exclusion fence. This site is managed by Parks Victoria and could be considered relatively secure. The Dandongadale stand, if still extant, is assumed to not have any protection against browsing animals.

Intense fire events, especially under expected climate change conditions may potentially lead to significant reduction in ramet abundance or even local extirpation. Fire may also have indirect effects by causing habitat degradation especially on dry slopes where post-fire erosion may occur.

While it is currently unknown if Twiggy Daisy-bush is susceptible to infection by *Phytophthora cinnamomi,* other species of the genus are listed as ranging from field-resistant to moderately susceptible. Climate change could influence disease severity and therefore Phytophthora constitutes a plausible threat to the taxon.

Decision by the Scientific Advisory Committee

The eligibility of the nominated taxon (including the extinction risk and the category of threat that applies to the taxon) to be specified in the Threatened List must be determined in accordance with the eligibility criteria prescribed for the purposes of Division 2 of Part 3 of the FFG Act.

The relevant eligibility criteria are prescribed in Schedule 1 of the FFG Regulations, which provides that a taxon is at risk of extinction in a particular category of threat if a primary criterion is met and is therefore eligible to be specified in the Threatened List.

As required under the Intergovernmental Memorandum of Understanding - Agreement on a Common Assessment Method for Listing of Threatened Species (to which Victoria is a signatory), eligibility has also been assessed in accordance with the *IUCN Red List Categories and Criteria (Version 3.1)* and *Guidelines for Using the IUCN Red List Categories and Criteria*.

For details of the IUCN criteria see Appendix 1.

Criterion A – Population size reduction

Insufficient data to determine eligibility.

Generation length could not be estimated with adequate certainty to estimate past or future declines over 3 generations. The Committee concludes that there is insufficient information to determine the eligibility of Twiggy Daisy-bush for listing in any category under this Criterion.

Criterion B – Geographic range (Extent of Occurrence and Area of Occupancy)

Eligible as Critically Endangered under IUCN Criterion B1ab(i, ii, iii, iv, v)+2ab(i, ii, iii, iv, v) (FFG Primary Criterion 3.1 - Subcriterion 3.1.2(a), (b)(i, ii, iii, iv, v))

Evidence:
The estimated Extent of Occurrence (EoO) across the taxon's distribution ranges from 8 to 285 km², based on accepted records.

The lower estimate is based on the two extant occurrences at Panton Hill and Christmas Hills. This estimate of the EoO is made equal to the Area of Occupancy (AoO) to comply with the definition of the AoO as an area included within the EoO. The upper estimate includes the record at Dandongadale where a single genet was last seen by Cam Beardsell in 1997. It is unknown whether the taxon persists at this site.

The estimated AoO across the taxon's distribution ranges from 8 to 12 km², based on 2 x 2 km grids derived from accepted records as above.

The taxon is severely fragmented naturally at the regional scale and anthropogenically at the landscape scale with all known occurrences separated at distances greatly exceeding the dispersal range of the taxon. Although seed are wind-dispersed (since they bear a tuft of barbellate bristles), the dispersal range within forest vegetation is unlikely to exceed one kilometre. The two stands at Panton Hill and Christmas Hills are separated by almost 6 km and these two stands are separated from the Dandongadale site by almost 160 km.

A single location is identified since the key threats to all known occurrences operate consistently across the very restricted ecological and geographic range of the taxon.

It has a continuing decline in (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations and (v) number of mature individuals, based on the current and projected impact of the identified threats.

Criterion C – Small population size and decline

Eligible as Critically Endangered under IUCN Criterion C2a(i) (FFG Primary Criterion 3.1 - Subcriterion 3.1.3(b)(i))

Evidence:
The Panton Hill occurrence comprises three clonal genets extending 55 m parallel to and above the road cutting, with an estimated 50 stems or ramets (David Cameron personal communication, 21 September 2024). The Christmas Hills occurrence comprises a single clonal genet with an estimated 50 ramets extending across an estimated 10 x 10 metres. Within this area, the taxon shares understorey dominance with a dense and robust stand of *Chrysocephalum semipapposum* (Clustered Everlasting). If still extant, the Dandongadale occurrence comprises a single clonal genet with one ramet (Cam Beardsell personal communication, 20 September 2024).

While it could be plausible to count clonal genets as single individuals rather than to count individual ramets, this method assumes that individual ramets are unlikely to survive alone. While each clone occupies a small area of only 5-20 m diameter with individual ramets separated by only one or several metres, the probability of persistence is high even if a ramet becomes isolated. Ramets within each clone share resources (water and nutrients) and share exposure to biotic or environmental threat, however this sharing doesn't necessarily imply vulnerability if disconnection occurs. If the vast majority of ramet stems are rooted directly below (i.e. 'whole' plants connected by stolons or rhizomes), then it is reasonable to count stems as mature individuals for the purpose of this assessment. There is no evidence of independent recruitment from seed and therefore maintenance of each clone is reliant on persistence of the clone by vegetative spread at the metre scale.

It is therefore estimated that there are approximately 100 mature individuals. The number of mature individuals is estimated to continue to decline, based on the current and projected impact of the identified threats. The number of mature individuals in each subpopulation is ≤ 50.

Criterion D – Very Small or Restricted Population

Eligible as Endangered under IUCN Criterion D (FFG Primary Criterion 4.1 - Subcriteria 4.1.4)

Evidence:
The taxon is estimated to have approximately 100 mature individuals.

Criterion E – Quantitative Analysis

Insufficient data to determine eligibility.
There is no population viability analysis available to provide evidence for this criterion.

Documentation

The published information provided to and sourced by the SAC has been assessed. To the best of their knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

Advertisement for public comment
In accordance with the requirements of Section 16D of the FFG Act, the preliminary recommendation was advertised for a period of at least 30 days.
The preliminary recommendation was advertised in:

- Victorian Government Gazette on 28 November 2024
- Engage Victoria
- DEECA website

Public submissions closed on 30 December 2024.

Following publication of the preliminary recommendation, the SAC received 16 submissions. Three submissions were neutral and 13 were in support of the preliminary recommendation. In formulating the final recommendation on this item, the SAC was not aware of any compelling evidence to warrant a change to the preliminary recommendation that the nominated taxon is eligible for listing.

Final Recommendation of the Scientific Advisory Committee

As outlined above, the nominated taxon satisfies at least one criterion of the set of criteria prepared and maintained under Division 2 of Part 3 of the FFG Act and stated in Schedule 1 of the FFG Regulations.

The SAC concludes that on the evidence available, the nominated taxon is eligible for listing as Critically Endangered in Australia because Primary Criterion 3.1 – Subcriteria 3.1.2(a), (b)(i, ii, iii, iv, v) and 3.1.3 (b)(i) of the FFG Regulations have been satisfied (IUCN criteria B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(i)).

Critically Endangered, in relation to a taxon of flora or fauna, means that the taxon is facing an extremely high risk of extinction in the wild in the immediate future.

The SAC are satisfied the taxon meets the 'special need to conserve' eligibility requirements under Division 2 Section 15 of the FFG Act. The taxon is morphologically distinct and recognised as valid by the Royal Botanic Gardens Victoria.

The Scientific Advisory Committee therefore makes a final recommendation that the nominated taxon be supported for listing as Critically Endangered in Australia under the *Flora and Fauna Guarantee Act 1988*.

Endorsement by the Convenor of the Scientific Advisory Committee **Date**

Dr. Michelle T. Casanova **10 February 2025**
Convenor

References

Hingston, A.B. and McQuillan, P.B. (2000). Are pollination syndromes useful predictors of floral visitors in Tasmania? *Austral Ecology* 25, 600-609.

IUCN (2012) IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.

IUCN Standards and Petitions Committee (2022) Guidelines for Using the IUCN Red List Categories and Criteria. Version 15. Prepared by the Standards and Petitions Committee. Accessed 27 February 2024. https://www.iucnredlist.org/documents/RedListGuidelines.pdf.

Molnar, C., Fletcher, D. and Parsons, R. (1989). Relationships between heath and *Leptospermum laevigatum* scrub at Sandringham, Victoria. Proceedings of the Royal Society of Victoria 101: 77–88.

Penman, T.D., Binns, D.L., Allen, R.M., Shiels, R.J. and Plummer, S.H. (2008). Germination responses of a dry sclerophyll forest soil-stored seedbank to fire related cues. *Cunninghamia* 10(4): 547–555.

VicFlora (2016) Flora of Victoria, Royal Botanic Gardens Victoria: *Olearia ramulosa* var. *tomentosa*. Accessed 24 September 2024. https://vicflora.rbg.vic.gov.au/flora/taxon/4d405afa-1494-4902-bfcb-2bdfac444988

Appendix 1: IUCN Red List Categories and Criteria

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).[1]

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 where the causes of the reduction are clearly reversible AND understood AND have ceased.

A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction projected, inferred 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 (AOO), extent of occurrence (EOO) and/or habitat quality
- **(d)** actual or potential levels of exploitation
- **(e)** effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

	Critically Endangered	Endangered	Vulnerable
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			

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 at 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			

D. Very small or restricted population

	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	**D1.** < 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 taxon to CR or EX in a very short time.	-	-	**D2.** typically: AOO < 20 km² or number of locations ≤ 5

E. Quantitative Analysis

	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

1 Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categories and Criteria*. Please refer to both documents for explanations of terms and concepts used here.