

## *Astrotricha linearis* subsp. 2 Narrow-leaf Star-hair

### Taxonomy

*Astrotricha linearis* subsp. 2 sensu Henwood, Makinson & Maling (1999)

### 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 A3c; B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)

### Species Information

#### Description and Life History

The plants are 1-1.5 m; stems felted. Leaves linear; 55-71 mm long, c. 1.5 mm wide; petiole 2.5-3 mm long. Inflorescence 60-70(-170) mm long; axis with a close indumentum, soon glabrescent; bracts sublinear, 4-4.5 mm long. Pedicels 5-8 mm long; petals 2-2.5 mm long; anthers 1.5 mm long. Fruit obloid-ellipsoid to slightly obovoid, 3.5-4.5 mm long, 2.5-4 mm wide. The leaves of subsp. 2 tend to be less asperate than those of subsp. 1. The taxon flowers from November to December. It regenerates from seed and is not known to root-sucker (VicFlora 2017).

#### Generation Length

The generation length of *Astrotricha linearis* subsp. 2 is inferred to be 50 years. This is based on the pre-settlement fire frequency which is plausibly around 50 years. It is also based on an inferred post-fire episodic recruitment strategy, since the taxon is not known to sucker from the root system.

#### Distribution

The taxon is endemic to Victoria. It is apparently restricted to areas between Mt Samaria and Mt Buffalo and adjacent areas including Ryans Creek and towards Tatong (VicFlora 2017).

#### Habitat

The taxon grows in shrubby open-forest (VicFlora 2017).

#### Threats

There has been some past decline as a result of land clearing,, but this is not likely to have been significant, based on the assumption that most populations occur in Box-Stringybark forests which are of low nutrient status and not targeted for agricultural clearance.

Threats to the taxon include Sambar browsing, in synergy with increased fire frequency and drought stress, leading to increased risk of recruitment failure.

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### 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:

#### Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is projected to be 30 to 50%, based on (c) above.

Future decline is based on Sambar browsing in synergy with increased fire frequency and drought stress leading to an increased risk of recruitment failure.

#### Eligible under Criterion A4 as Vulnerable

The population reduction over any 150 year period, including both past and future (up to 100 years into the future), the next 100 years is inferred to be 30 to 50%, based on (c) above.

Past decline is based on past land clearing, and future decline is based on Sambar browsing and increased fire frequency and drought stress

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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:

#### Eligible under Criterion B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,226 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, and is estimated to have 1 location. It has a continuing decline in (ii), (iii), (iv) and (v) above, based on the effects of Sambar browsing in synergy with increased fire frequency and drought stress leading to an increased risk of recruitment failure.

The taxon is severely fragmented naturally at landscape scale based on very localised dispersal, reliance on seed bank and highly localised populations typical of the genus.

#### Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 28 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is estimated to be severely fragmented, has 1 location, and has a continuing decline in (ii), (iii), (iv) and (v) above.

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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

The taxon is poorly known and estimates of population size are unavailable.

Criterion D. Very small or restricted populations				
		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 km <sup>2</sup> 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](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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VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Astrotricha linearis* subsp. 2. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/d312fc07-648f-4bd8-8182-1000b24599bd>