



## *Lepyrodia flexuosa* Twisting Scale-rush

### Taxonomy

*Lepyrodia flexuosa* (Benth.) L.A.S. Johnson & O.D. Evans

### Current conservation status

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

### Proposed conservation status

Vulnerable in Australia

Criteria B1ab(iii)+2ab(iii)

### Species Information

#### Description and Life History

The taxon is a perennial monoecious herb. Rhizomes creeping or tufted, covered (at least when young) with closely appressed scales. Stems erect or rarely scrambling, green, glabrous, hollow portion of stem pith circular, 20-100(-200) cm long, terete or subterete, branched, flexuose on flower bearing parts,  $\pm$  smooth. Leaves reduced to sheathing bracts, sheathing leaves spaced along stem 4-35 mm long, appressed or loose (when subtending branches), striate; apex extended into a reflexed, shortly terete point (which is often broken off). Inflorescence with distal sessile clusters of flowers subtended by floral bracts 1.5-4(-7) mm long, erect,  $\pm$  subcircular to broadly ovate, much shorter than the subtending branch of the inflorescence and usually shorter than the flowers, pale, loose, dry and membranous; margin translucent; apex rounded to truncate, usually terete and reflexed distally. Male and female flowers in the same inflorescence, either in separate clusters or mixed. Perianth purplish, 2.5-3 mm long, the outer whorl slightly shorter than the inner. Styles 3, usually arising close together on the ovary. The taxon flowers from October to March-April (VicFlora 2019).

Field observations suggest rhizomes are relatively short and congested, with the plant appearing more tufted than loosely spreading.

#### Generation Length

The generation length of *Lepyrodia flexuosa* is estimated to be 45 to 90 years based on a longevity of at least 45 years, and an episodic or sporadic and opportunistic recruitment in response to fire, flood, or other more localised site disturbance events. Although the precise mode of recruitment is undocumented, seed recruitment is inferred to be a rare event. This is because adult individuals are likely to resprout vegetatively from established rhizomes following most disturbance events, with the rhizome potentially surviving indefinitely unless subjected to extreme events. Such events include soil-displacing mass erosion, as well as scouring or site burial by material translocated by floodwaters.

#### Distribution

The taxon is endemic to the Grampians region in western Victoria. It is largely confined to the Grampians National Park, with a western outlier in the Black Range and an eastern outlier at Mount Buangor.

#### Habitat

The taxon occurs in moist, peaty soils or at margins of small creeks (VicFlora 2019).

### Threats

The greatest direct threats to the taxon are intense fire events followed by heavy rainfall events. This combination of events results in graphic erosion of steep upper slopes, seepage areas and drainage lines, scouring of middle order stream courses and massive deposition of sand, silt, and gravel along drainage lines and associated riparian habitats at lower elevations. Such events have already occurred throughout the Grampians and, also at Wilsons Promontory in recent years, transforming the habitats of moisture-dependent habitat specialists such as *Lepyrodia flexuosa*. Occasionally, such events result in the erosion of the entire soil profile and associated vegetation down to mineral earth or bedrock. Alternatively, the events have buried areas under sand, silt, gravel, loose rock, and uprooted vegetation.

The taxon is threatened by climatic drying and warming, as well as by anthropogenic fire regimes. When acting synergistically, these threats are projected to result in a contraction in the area, extent, and quality of habitat for the taxon given its specialist habitat needs of a reliable soil moisture regime, one fed by streams and soaks or peaty moisture-retentive soils. In the longer term, the taxon is also threatened by adult mortality and recruitment failure due to extreme drought events and persistent drought stress impacting upon the supply of reliable ground water and seepage from upslope uptake zones.

### 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.

There is no evidence to indicate whether the taxon has suffered significant historic decline. It should be noted that habitat loss to agriculture or infrastructure development is likely to be minor given that all known occurrences are

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on public land, most of which is now protected in national or state parks. Future decline cannot be estimated with any confidence since the identified threats operate stochastically and with unpredictable intensity.

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 and B2 as Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 3,784 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) across the taxon's range is estimated to be 120 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

It is inferred to have six locations. All key identified threats apply across its range and can rapidly affect all individuals of the taxon present in each of the main geographical areas – Black Range, Mount Buangor, and separated areas of the Grampians – but are unlikely to affect all areas equally and simultaneously

It has a continuing decline in (iii) above, based on the current and projected impact of the identified threats.

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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

No reliable estimate of total population size is available for the taxon. However, field observations suggest it is likely to be in the thousands. Representative quadrat data, however, indicates that the taxon rarely exceeds a projective foliage cover of 5% at the quadrat scale, suggesting most stands are of low density.

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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<https://vicflora.rbg.vic.gov.au/flora/taxon/31b33d47-4feb-4564-9d2a-6483df3dcae2>