



## *Stackhousia nuda* Wiry Stackhousia

### Taxonomy

*Stackhousia nuda* Lindl.

### Current conservation status

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

### Proposed conservation status

Vulnerable in Victoria

Criteria A3ce; D2

The bushfires of 2019/2020 are believed to have affected around 54% of the taxon's modelled habitat. The overall effects of the fire are yet to be determined.

### Species Information

#### Description and Life History

The taxon is a very slender, weakly erect, glabrous, non-rhizomatous perennial to 50 (-80) cm high; usually branched above base. Leaves reduced to scales to 1.5 mm long. Inflorescence a lax one-sided spike; flowers 1-4 at nodes, shortly pedicellate, subtended by a cluster of several scale-like bracts to 1 mm long. Hypanthium 0.5-0.9 mm long; sepals narrowly triangular, 0.7-0.9 mm long, with whitish erose-serrulate margin; corolla yellow to yellow-green, tube 2-3.3 mm long, lobes 1.3-2.1 mm long, narrowly acute to subacuminate; gynoecium 3-partite. Mericarps 1-3, obovoid-ellipsoid to ellipsoid, 1.8-3.4 mm long, rugose to verrucose, the base with small shallow cavity but no protruding bony endocarp. The taxon flowers from September to March (VicFlora 2019).

#### Generation Length

The generation length of *Stackhousia nuda* is estimated to be 20 to 40 years. This is based on a plausible longevity of 5-10 years and an inference that the taxon is a fire-sensitive, obligate seed regenerator (OSR). It is likely to recruit episodically from a soil-stored seedbank following intense fire events, and the estimated pre-European settlement fire interval is estimated to be 20-40 years or more. The swampy habitat of the taxon is subject to intense fire events at a lesser frequency than the surrounding lowland forest. Such fires typically consume all canopy vegetation with the risk of incineration of both rootstocks and peaty substrate. This happened at Anglesea after the 1983 Ash Wednesday bushfires which also consumed much of the lowland forests of far East Gippsland. Under such circumstances, the taxon is likely to behave as a fire sensitive OSR. The longevity of the taxon is likely to be limited by the interval between intense fire events within its habitat range.

#### Distribution

In Victoria, the taxon is confined to near-coastal districts of East Gippsland from Marlo east to the New South Wales border. The taxon also occurs in Queensland and New South Wales (VicFlora 2019).

#### Habitat

In Victoria, the taxon is confined to lowland wet heaths and peaty swamps (VicFlora 2019).



# *Stackhousia nuda* Wiry Stackhousia

Quadrat data in the Victorian Biodiversity Atlas (VBA), and specimen records in the Australian Virtual Herbarium (AVH), indicate that the habitat range of the taxon includes Wet Heath, Button Grass Plains dominated by *Gymnoschoenus sphaerocephalus* (Button Grass) and Grass Tree Plains dominated by *Xanthorrhoea resinosa* (Spear Grass-tree). It rarely enters peaty swamps or *Melaleuca* Swamp Thicket. In addition to the above, associated, dominant taxa include *Allocasuarina paludosa* (Scrub Sheoak), *Baeckea linifolia* (Swamp Baeckea), *Bauera rubioides* (Wiry Bauera), *Baumea rubiginosa* (Soft Twig-rush), *Empodisma minus* (Spreading Rope-rush), *Epacris obtusifolia* (Blunt-leaf Heath), *Eurychorda complanata* (Flat Cord-rush), *Gahnia radula* (Thatch Saw-sedge), *Goodenia stelligera* (Spiked Goodenia), *Hibbertia rufa* (Brown Guinea-flower), *Lepidosperma filiforme* (Common Rapier-sedge), *Leptocarpus tenax* (Slender Twine-rush), *Leptospermum continentale* (Prickly Tea-tree), *L. lanigerum* (Woolly Tea-tree), *Lindsaea linearis* (Screw Fern), *Melaleuca ericifolia* (Swamp Paperbark), *M. squarrosa* (Scented Paperbark), *Patersonia fragilis* (Short Purple-flag), *Selaginella uliginosa* (Swamp Selaginella), *Schoenus brevifolius* (Zig-zag Bog-rush), *Sprengelia incarnata* (Pink Swamp-heath), *Tetraria capillaris* (Hair Sedge), *Viminaria juncea* (Golden Spray), and *Xyris operculata* (Tall Yellow-eye). Quadrat data indicates the taxon almost invariably occurs with projective foliage cover less than 1% at the quadrat scale, very rarely exceeding 1%.

## Threats

Historic decline through habitat loss to agriculture is likely to have been relatively minor since the habitat range is of marginal value for grazing or cropping and all Victorian records are within national or coastal parks or state forest. Some habitat loss may have occurred on the Marlo Plains where the taxon was collected by Frank Robbins in 1937 and by Norman Wakefield in 1945.

A key threat to the taxon is the increasing risk of repeat fire events at intervals below or approaching its tolerable fire interval (TFI). Such events may result in high mortality of adults with some risk of seedbank depletion and complete mortality of the last cohort of episodic post-fire recruits.

Climatic drying and warming as a result of climate change and inappropriate fire regimes, particularly the extensive use of planned burning across the region, operate synergistically to increase risk to the habitat of the taxon. Extreme drought events increase the risk of recruitment failure and, potentially, seedbank exhaustion since the taxon is assumed to be dependent on seed-banking, particularly for post-fire recruitment. In the longer term, climatic drying is projected to lower the water table, resulting in a contraction in the local extent of habitat and invasion by dryland shrubs and trees.

The taxon may also be susceptible to Sambar Deer (*Rusa unicolor*), Hog Deer (*Axis porcinus*) and feral pig activity. Sambar Deer and feral pigs in particular, prefer the habitat range of the taxon. Sambar Deer frequently rut and wallow in wet sites and pigs excavate wetland and peaty sites. The habitat of the taxon is not considered susceptible to invasion by exotic weeds.

### 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>based on any of the following:</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 Vulnerable

The population reduction over the next 60 to 100 years is projected to be 30 to 45%, based on (c) and (e) above.

Future decline is based on the projected impact of the identified threats such as repeat fire events at intervals below or approaching its TFI, climatic drying and warming as a result of climate change and inappropriate fire regimes, extreme drought events, and deer and feral pig activity.

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 is estimated to be 1,774 km<sup>2</sup> and the Area of Occupancy (AoO) is estimated to be 112 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 <u>C1</u> or <u>C2</u>				
<u>C1</u>	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)
<u>C2</u>	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**

# Stackhousia nuda

## Wiry Stackhousia

There is no available estimate of population size for the taxon, although it is likely to be in the thousands despite the low population density of the taxon at a local scale.

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 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. The taxon has a restricted distribution, occurring in a single location, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within a time frame of one or two generations. This is in response to the impact of the identified long-term threats, notably repeat fire events, climatic drying and warming, inappropriate fire regimes, extreme drought events, and deer and feral pig activity.

**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)
- VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Stackhousia nuda*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/47e28443-3025-41ab-b408-978b50863251>