Threatened Species Assessment

Levenhookia sonderi
Slender Stylewort

Taxonomy

Levenhookia sonderi (F. Muell.) F. Muell.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(ii,iii,iv,v)

Species Information

Description and Life History

The taxon is an ephemeral herb, 3-10 cm high, simple or branched near base, glandular-pubescent and green throughout. Leaves orbicular, 1-2 mm long, 1-3 mm wide, glandular, shortly petiolate; leafy bracts smaller. Inflorescence a terminal corymb of 3-6 flowers. Calyx globose, 1-2 mm long, lobes obovate, more or less equal; corolla whitish, labellum shortly clawed, the hood-shaped lamina deep purple, almost equal in length to the lobes; stigma distinctly 2-lobed. Capsule globose, 3 mm long; seeds brown, globose, smooth. Flowers from September to December (VicFlora 2017).

Generation Length

The generation length of *Levenhookia sonderi* is estimated to be 1 to 4 years. This is based on the taxon being regarded as an annual or ephemeral, with a plausible longevity of 1-6 months. It occurs in regions which receive reasonably reliable seasonal rainfall, so most populations are therefore expected to recruit from the seedbank in most years.

Distribution

The taxon occurs mostly in the south-west in the Little Desert, lower Glenelg River, and Stawell areas, but also extends eastward to Rushworth in the north and Beaconsfield in the south (VicFlora 2017). It is no longer considered to be a Victorian endemic since it also occurs in far south-eastern South Australia.

Habitat

The taxon occurs in seasonally damp ground and drying swamps in lowland areas (VicFlora 2017). The habitat at the western end of the range includes seasonally damp ground and drying swamps in lowland areas. The habitat at the eastern end of the range includes rocky outcrops and other elevated sites with at least some seasonal moisture availability within Box-Ironbark and related Box-Stringybark forests.

Threats

Weed invasion is a threat to the taxon, particularly in drier skeletal eastern sites. Weeds include *Vulpia, Aira, Briza, Arctotheca, Hypochaeris* and *Anthoxanthum*. Native and exotic *Juncus* taxa are likely to invade and dominate ephemerally moist sites in the west in response to a post-settlement imbalance in grazing and digging animals.

Digging animals such as bandicoots, echidnas and wombats have been largely replaced by rabbits, kangaroos and, marginally, sheep and goats.

The taxon is also increasingly threatened by climatic drying resulting in reduced recruitment success and seedbank replenishment. While there is also some risk of recruitment failure, most annuals are opportunistic and successfully flower and set at least some seed, regardless of how poor the season is once the seed has successfully germinated.

There is also a projected increase in grazing pressure and site disturbance in refugial microhabitats. In these sites, moisture is retained by cryptogamic crusts and wefts and, in a drying landscape, native and exotic browsers will be increasingly attracted to it.

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:

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.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 128 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at regional and landscape scales, and anthropogenically at the landscape scale. The taxon is a habitat specialist occupying microhabitats at separations greatly exceeding the highly localised dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal.

It is estimated to have 2 locations, and has a continuing decline in (ii), (iii), (iv) and (v) above, based on the continuing and projected impacts of weed invasion, imbalances in grazing and digging animals, climatic drying, and the targeted impact of native and exotic browsers in refugial microhabitats.

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 the total population size for the taxon is available.

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 km2 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.

Raulings, E.J. (1999). *Stylidiaceae*. In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 4*, *Cornaceae to Asteraceae.* Melbourne: Inkata Press.

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Levenhookia sonderi.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/1a1b806f-5e86-469c-8c89-438bc4edc1b7