

Tmesipteris elongata Slender Fork-fern

Taxonomy

Tmesipteris elongata P.A. Dang.

Chinnock recognized *T. elongata* subsp. *robusta*, a New Zealand endemic, as being more branched, with stems prominently winged by leaf bases, and with longer, broader leaves. This entity, however, is not widely accepted (VicFlora 2021).

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A4abce; C2a(i)

Species Information

Description and Life History

The taxon is a perennial epiphytic fern with fronds unbranched, 15-60 cm long, growing for more than one season. Leaves not crowded (c. 2-4 per cm), variable in shape, 15-30 mm long, similar in size throughout plant, firm; base symmetrical to asymmetrical; apex blunt with fine excurrent point, 1-2 mm long. Sporophyll lobes slightly shorter than leaves, c. 1-2 mm wide. Synangium elongate, mostly 3-5 mm long, with rounded lobes (VicFlora 2021).

Generation Length

The generation length of *Tmesipteris elongata* is estimated to be 50 to 100 years. Most *Tmesipteris* species attain maturity within the first few years but are very long-lived, as they arise from rhizomes deep within the treefern host. The habitat is generally undisturbed, and the plants are killed by fire.

Distribution

The taxon is known from few scattered localities in Victoria, where localised in the Otway and Strzelecki Ranges, upper Tyers River and Wilsons Promontory, and rare. It also occurs in Tasmania, including Bass Strait Islands, and New Zealand (VicFlora 2021).

Habitat

The taxon is epiphytic on *Dicksonia antarctica* (Soft Tree-fern) (VicFlora 2021), almost exclusively within mature stands of Cool Temperate Rainforest dominated by *Nothofagus cunninghamii* (Myrtle Beech), often with *Atherosperma moschatum* (Southern Sassafras) and, in sites with a history of disturbance, *Acacia melanoxylon* (Blackwood).

Threats

The taxon is reliant on its Cool Temperate Rainforest habitat. Cool Temperate Rainforest is threatened primarily by severe bushfires; stands may be eliminated by a single severe bushfire or progressively reduced by a series of bushfires. Increased fire severity and frequency is now the greatest threat to the taxon and its rainforest habitat,

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neither of which are dependent on fire for recruitment or maintenance. The taxon is also threatened by rutting, wallowing, antler rubbing and targeted browsing by deer, particularly Sambar (*Rusa unicolor*), which target rainforest and other riparian communities.

Forestry operations including timber harvesting and road construction in or adjacent to its habitat in parts of its range may also pose a threat in the short-term due to edge effects including increased light and wind penetration, elevated temperatures and reduced humidity. In addition to edge effects, permanent roads create conditions suitable for weed establishment, especially for Blackberries (*Rubus* species). Myrtle Wilt is a significant threat in *Nothofagus*-dominated Cool Temperate Rainforest.

Likely habitat for Slender Fork-fern occurs substantially within the Comprehensive, Adequate and Representative (CAR) reserve system, including parks, reserves and special protection zones in State forest. There are no species-specific protections for Slender Fork-fern included in the Victorian Code of Practice for Timber Production 2014, however other more general prescriptions such as protection and buffering of rainforest, old growth and waterways also provide protection from timber harvesting. In recent years, modified harvesting and forest regeneration practices have been implemented in native forest to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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;">based on any of the following:</p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p> | | | |

Evidence:

Eligible under Criterion A2 as Endangered

The population reduction over the past 150 to 300 years is projected to be 50 to 85% (midpoint 65%), based on (c) and (e) above.

The primary factor in past decline is the clearing of habitat for agriculture and plantation establishment in the Otway Ranges and Strzelecki Ranges.

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Eligible under Criterion A3 as Endangered

The population reduction over the next 100 years is projected to be 50 to 90% (midpoint 65%), based on (c) and (e) above.

The projected future decline is based on the likely impact of climate change in the form of more frequent and severe droughts and associated altered bushfire regimes.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 150 to 300 year period, including both past and future (up to 100 years in the future), is estimated to be 60 to 95 (midpoint 75%), based on (a), (b), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

This is based on the impacts of the past and future threats, notably increased fire and drought.

| 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 ² | < 5,000 km ² | < 20,000 km ² |
| B2. Area of occupancy (AOO) | < 10 km ² | < 500 km ² | < 2,000 km ² |
| 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) is estimated to be 84 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is severely fragmented naturally at the regional scale and both naturally and anthropogenically at the landscape scale. Although spores are wind-dispersed, the dense canopy of mature rainforest and fern gully vegetation is likely to limit the effective dispersal range to tens of metres, restricting spore dispersal to individual stands of rainforest within each valley or subcatchment.

Four locations can be identified based on differences in climate, land management and tenure and fire regimes: the Otways, Strzeleckis, Wilsons Promontory and the two isolated occurrences in the Central Highlands.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) 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:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 100 to 500 mature individuals. An estimate of current population size is based on field observations by David Cameron although accurate estimates are complicated by the fact that all fronds on any one host *Dicksonia* individual may represent no more than a single genet, connected by a long-established rhizome buried within the host stem.

The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is 50 or fewer.

| 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 ² or number of locations ≤ 5 |

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 100 to 500 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.



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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

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