

Threatened Species Assessment

Daviesia laevis Grampians Bitter-pea

Taxonomy

Daviesia laevis Crisp

Possible hybrids with *D. leptophylla* have been noted near Halls Gap in the Grampians (VicFlora 2019).

Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2003).

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

Proposed conservation status

Critically Endangered in Australia

Criteria C1+2a(i)b

Species Information

Description and Life History

The taxon is a slender erect shrub 2-4 m tall with smooth, somewhat waxy, arching branches which are circular to slightly angular in cross section. Leaves are represented by linear to narrow-elliptic leathery phyllodes (flattened leaf stalks) which are 4-15 cm long, 5-25 mm wide, grey-green with entire margins, prominent midrib and acute tips. Flowers are mostly orange-yellow, in elongated sprays of up to 15 flowers, usually 20-30 mm long. The pod is obliquely triangular, 7-10 mm long, 5-6 mm wide, with compressed ovoid seeds about 3 mm long. The taxon flowers from September to December (VicFlora 2019).

Generation Length

The taxon is a fire-sensitive obligate seed regenerator (OSR) which typically recruits following infrequent intense wildfires from a long-persistent soil-stored seedbank which typically persists for many decades following the senescence of adult plants. The generation length of *Daviesia laevis* is therefore estimated to be 35-70 years based on the plausible fire intervals across its habitat range under undisturbed pre-European settlement conditions. Plants are observed after fire but soon disappear and hence, are treated as relatively short-lived shrubs.

Distribution

The taxon occurs in western Victoria, in the Victorian Midlands IBRA Bioregion (DEH 2000). Populations were recorded from the Grampians at Mount Cassell, Grevillea Creek, Lake Wartook Rd, Mt William, Stoney Creek Track, Mt Difficult Range, Long Gully Creek, and Bovine Creek, and from Mt Cole State Park, Langi Ghiran State Park, Mt Buangor State Park, and the Black Range State Park. The most recent records are from Mt Cole (1991), Mt Langi Ghiran (2004), and the Grampians National Park at Bovine Creek (2004) (Murphy et al. 2006).

Habitat

The taxon was initially described by Crisp (1991), and its habitat was defined as occurring in protected montane sites such as gullies on sandstone, or granite skeletal or sandy soils sometimes amongst boulders alongside creeks. *Eucalyptus obliqua* and *E. alaticaulis* were reported as being the dominant taxa in an open forest, with *D.*

Daviesia laevis

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laevis occurring along the borders of the forest and the adjacent *Leptospermum*, *Melaleuca* and *Gahnia* thicket. At Langi Ghiran State Park plants are typically located in southern facing granite outcrops, are sparsely distributed, and often amongst boulders at 800-900 metres altitude. Overstorey taxa include *E. obliqua*, *E. goniocalyx* and (rarely) *E. pauciflora*, the shrub layer includes *Acacia melanoxylon*, *A. oxycedrus* and *A. paradoxa*, while ground covers include *Olearia* taxa, *Poa sieberiana*, *Lomandra longifolia*, and *Microlaena stipoides*.

Threats

Crisp (1991) suggests that frequent burning at Mount Cole State Forest may have led to the decline of populations at this site. Conversely, burning at Langi Ghiran may be too infrequent, as prescribed fires are difficult to maintain there and are unlikely to be implemented. Lightning strikes do not appear to have been sufficient to carry fires in the past.

Browsing by macropods is a possible risk to seedling recruitment (Murphy et al., 2008), with intense browsing having been observed the Mount Cole State Forest (F. Coates pers. comm.), and evidence of browsing of seedlings at Mt Langi Ghiran.

The presence of *Phytophthora cinnamomi* (Cinnamon Fungus) within the Grampians National Park is a direct threat to the taxon (N Reiter pers. comm. 2004). It may also be a risk at one of the sites in Langi Ghiran near an area that was previously used by hang glider enthusiasts, which shows potential signs of infection. In addition, the number of mature plants is low, and these plants occur in isolated populations.

There is a lack of genetic variability within the Silverband Road population, and the proximity of individuals to roadside and picnic areas may be an issue.

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>	<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>
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Evidence:

Eligible under Criterion A3 as Endangered

The population reduction over the next 30 to 45 years is estimated to be 0 to 85 % (midpoint 50%), based on (c) and (e) above.

Provided that suitable fire regimes are implemented, and grazing is excluded from these areas, the populations should remain stable and possibly increase. However, given the very low numbers and barriers to implementing recovery actions, it is equally likely that numbers will continue to decline.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A4 as Endangered

The population reduction over any 30 to 45 year period, including both past and future, is estimated to be 0 to 85%, (midpoint 50%), based on (c) and (e) above.

The taxon was thought to be extinct prior to 2004. It is most likely that it was persisting in very low numbers or in the soil seed bank, with recruitment occurring after fire. There are apparently more plants now (i.e., post 2004 fires) than previously recorded. It should be noted that the Black Range (and maybe Mt Cole) subpopulations are possibly extinct. Provided that management continues, the populations should remain stable and possibly increase, but it is equally likely that numbers will continue to decline.

The causes of reduction may not have ceased, be understood or be reversible.

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 B as Endangered

The Extent of Occurrence (EoO) is estimated to be 1,700 km², and 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).

Considering the limited dispersal ability of the taxon, the barriers to dispersal, or lack of habitat separating them, the subpopulations can be considered to be severely fragmented.

It has 2 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v). It is inferred to have extreme fluctuations in (i), (ii), (iii) and (iv.). The presence of extreme fluctuations is based on surveys undertaken of this taxon from 2004-2017. Plants are observed after fire but soon disappear, hence, it is treated as a short-lived shrub.

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 C1 as Critically Endangered

It is estimated that there are 70 mature individuals. This is based on targeted surveys since 2004, with the total number, including seedlings, at approximately 80 plants.

A continuing decline of 0 to 85% (midpoint 50%) is estimated to occur within 1 generation.

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 70 mature individuals. The number of mature individuals is estimated to continue to decline, and the number of mature individuals in each subpopulation is fewer than 50.

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: A.O. < 20 km ² or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 70 mature individuals.

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

References

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