Threatened Species Assessment

Scleranthus diander
Tufted Knawel

Taxonomy

Scleranthus diander R. Br.

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(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a lax, decumbent, perennial with woody base; stems to 10 cm long, usually glabrous. Leaves 3-7 mm long, 0.2-0.7 mm wide, thickened towards apex, keeled, glabrous; apex mucronate with mucro 0.2-0.9 mm long; margin very narrow, scarious, papillose and appearing denticulate. Inflorescence a sessile cluster of many sessile flowers; peduncle elongating to 2.2(-3.8) mm in fruit; bracts papillose and glabrous; pedicels absent, obscure, or to 0.7 mm long. Sepals 5, transversely triangular to ovate, (0.5-) 1-2 mm long, 0.3-1.2(-1.6) mm wide, overlapping at base, margin scarious, midrib keeled; stamens 2, enclosed within the calyx, caducous. Fruit ribbed, 10-nerved, 2.2-3.5 mm long, 0.7-1.5 mm wide. The taxon flowers November to January (VicFlora 2020).

Generation Length

The generation length of *Scleranthus diander* is estimated to be 10 to 20 years (midpoint 15 years). The taxon is a perennial of moderate longevity which is likely to be fire-sensitive but relies largely on opportunistic recruitment in response to optimal seasons and, in some grassy habitats such as on serpentine geology, localised disturbance events which create inter-tussock gaps. Longevity is plausibly in the 5-25 year range, noting that adult plants are brittle and easily damaged. Although fire-sensitive, mortality and recruitment are rarely likely to be cued by fire, which is likely to have occurred at pre-settlement intervals of 35-70 years, or more frequently in grassy habitats on serpentine sites and with only patchy intensity and penetration of rocky habitats.

Distribution

The taxon is restricted in Victoria almost exclusively to alpine and montane districts in the east of the state, from the Snowy Range to the NSW border between the Cobberas and the Bendoc district. Unvouchered site records for Dergholm State Park near the South Australian border are supported by a single South Australian collection taken in the Penola district in 2009. It is also found in SA (near Penola only), NSW, and Tasmania (VicFlora 2020).

Habitat

The taxon is found mostly in montane grassland and open woodlands above 500 m, often in stony soils (VicFlora 2020).

Its habitat range includes dry open alpine heathland, alpine herbfield, Snow Gum woodland dominated by *Eucalyptus pauciflora* subsp. *pauciflora* (White Sallee), low open woodland dominated by *E. dives* (Broad-leaf Peppermint), *E. macrorhyncha* (Red Stringybark) and *Allocasuarina verticillata* (Drooping Sheoak), and grassy

woodland dominated by *E. albens* (White Box) in the Deddick River Valley. The taxon is typically associated with skeletal soils on dry rocky slopes, ridgelines, cliffs, summits, or flat basalt pavements. The taxon ascends to the highest elevations in the state at Mt Feathertop (1922 m) and descends to 180 m elevation on the Snowy River at McKillops Bridge where recorded in riparian shrubland.

A proportion of occurrences are associated with serpentine geology, as evidenced by collectors' notes for collections from the New England region in northern NSW. In Victoria, the taxon is consistently recorded in quadrat survey sites in the vicinity of a Chromite Mine on the Dolodrook River north-east of Licola, where it is associated with grassland or grassy woodland strongly dominated by *Themeda triandra* (Kangaroo Grass) on serpentine-influenced substrates. Other Victorian collectors consistently note rocky sites, many on igneous or extrusive (basalt) geological formations. At other sites the taxon occurs on sediments such as shales or metamorphic substrates. The taxon is also recorded on limestone at Limestone Creek.

The habitat of the highly disjunct occurrences in the Dergholm State Park is not recorded but is likely to be on sandy soils.

Threats

The taxon is likely to have suffered only minor historic decline through habitat loss to agriculture since dry rocky habitats are of low productivity. In some districts, grassy woodlands of only marginal agricultural potential have been cleared for stock grazing, notably in the Deddick River Valley and in the Bendoc, Suggan Buggan, Wulgulmerang, Benambra, Omeo, Cobungra, and Licola districts.

Current threats are difficult to identify with confidence although several emerging threats can be identified. The taxon is likely to be at increasing risk from climatic warming and drying and associated increases in fire frequency. Although the taxon is well adapted to dry and often rocky habitats and therefore inferred to be reasonably drought tolerant, it is likely to be at increasing long-term risk of adult mortality and recruitment failure in response to extreme and protracted drought stress, resulting in seedbank depletion and local extinction. The taxon may also be at long-term risk of seedbank depletion and local extinction in response to repeat fire events at intervals approaching the tolerable fire interval for the taxon, although this risk is currently mitigated by the relatively low rate of fuel accumulation in dry and rocky habitats. On account of its brittle and sparse habit, the taxon is likely to be at continuing risk of trampling by Sambar Deer (*Rusa unicolor*), goats, and visitor traffic, and by rabbit activity including browsing, digging and warren construction. Weed competition is not considered a significant threat in dry rocky habitats although grassy sites in partially cleared farming districts at Tableland elevations are threatened by a suite of agricultural weeds such as *Verbascum thapsus* (Great Mullein) and numerous taxa of *Trifolium* (Clover).

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:

Eligible under Criterion A2 as Vulnerable

The population reduction over the past 30 to 60 years is estimated to be 10 to 40% (midpoint 25%), based on (c) and (e) above.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 30 to 60 years is projected to be 15 to 35% (midpoint 25%), based on (c) and (e) above.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 30 to 60 year period, including both past and future, is estimated to be 10 to 40% (midpoint 35%), based on (c) and (e) above. 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 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 226 to 234 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas. The lower bound estimate excludes highly disjunct unvouchered Beauglehole list records from Dergholm State Park in far Western Victoria.

The taxon is estimated to be severely fragmented naturally at the regional, subregional and landscape scales, and anthropogenically at the landscape scale in some districts. Seed is likely to be dispersed by ants (myrmecochory), which operate at the metre scale only.

It is estimated to have a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats, notably climatic warming and drying, and associated increases in fire frequency.

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

There is no available estimate of total population size, although it is likely to be in the thousands since the taxon is occasionally recorded with projective foliage cover of 5-25% at the quadrat 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 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.

VicFlora (2020). Flora of Victoria, Royal Botanic Gardens Victoria: *Scleranthus diander*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/69cbb9d4-054c-43a5-8382-b81743cea340