Threatened Species Assessment

Viola caleyana
Swamp Violet

Taxonomy

Viola caleyana G. Don

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criterion B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a perennial herb, glabrous; stems elongated, to 30 cm long; stolons absent. Leaves along stem, sometimes clustered at nodes; lamina circular to triangular-ovate, 10–50 mm long, 10–50 mm wide, base cordate, apex obtuse, margins shallowly scalloped; petiole 1–6 cm long; stipules free, linear-lanceolate, entire or sparsely toothed. Flower-scapes 2–22 cm long; bracteoles at or above middle. Sepals lanceolate, 3–4 mm long, acute, basal appendages small; petals 8–10 mm long, white, rarely pale violet, lower (anterior) petal with short, broad spur, lateral petals sometimes slightly pubescent inside. Capsule 3-angled, 7–9 mm long. Flowers November-January (VicFlora 2021).

Its seeds may potentially be dispersed by water downstream from upstream populations and by ants, however data is lacking.

Generation Length

The generation length of *Viola caleyana* is suspected to be 20 to 30 years. This is based on the taxon's assumed longevity and continuous recruitment. It is a loosely tufted perennial herb of moderate longevity, reproducing only by seed. Its recruitment is continuous but is also likely to be pulsed after fire from a soil-stored seedbank. Its breeding system is unknown i.e., whether the taxon has chasmogamous open-pollinated flowers or cleistogamous flowers self-pollinated in bud, as is typical of *Viola*. Pollination of chasmogamous flowers is by insects for a nectar reward. Cleistogamous flowers are likely, but are not reported in the literature. Its fire response is undocumented, but it is assumed to be a resprouter following moderate fire.

Distribution

V. caleyana is confined to north-east Victoria and East Gippsland at low to tableland elevations (VicFlora 2021).

Habitat

The taxon occurs in riparian forest and similar environments, including margins of off-stream wetlands, on seasonally waterlogged soils, often among rocks. Sites may be subject to periodic temporary flooding.

Threats

Threats to the taxon include climate change (decreased rainfall, increased evaporation, extreme temperatures); extreme rainfall events (1 in 100 years flooding) causing flash floods, soil erosion and/or severe scouring of riparian environments; increased frequency and intensity of fire; environmental damage to hydrology, soils, wetland and dryland vegetation; structural damage to plants by Sambar Deer (*Rusa unicolor*), cattle, and feral horses; smothering by flood debris; and weed invasion.

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

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshod for eligibility under criterion A3.

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 Vulnerable

The Area of Occupancy (AoO) across the taxon's range is estimated to be 124 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The main threats to the taxon (i.e. fire, climatic drying and warming, habitat loss and fragmentation, weed invasion, fungal pathogens and extreme drought stress) have a non-reversible impact on the individuals of the taxon and occur in a stochastic manner, and have the potential over time to threaten the majority of individuals in the geographic area. There is considered to be seven such areas, so there is considered to be seven locations.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats, such as climate change, extreme rainfall events, increased frequency and intensity of fire, environmental and structural damage, flood debris, and weed invasion.

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

There is insufficient evidence to determine the number of mature individuals.

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:

Ineligible under Criterion D

There is insufficient evidence to determine the number of mature individuals.

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

VicFlora (2021). Flora of Victoria, Royal Botanic Gardens Victoria: *Viola caleyana*. Retrieved from https://vicflora.rbg.vic.gov.au/flora/taxon/5948562f-a1e7-468c-a794-9cd3904eec35