Threatened Species Assessment

Gaultheria hispida
Snow-berry

Taxonomy

Gaultheria hispida R. Br.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*. (SAC 1999).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(i,ii); D

Species Information

Description and Life History

The taxon is an erect to spreading shrub, typically 1-2 m tall. Young stems and leaf undersurfaces hispid with rigid bristle-like hairs, reddish in colour and spread at near right angles to the surface. Leaves are alternate, typically lanceolate, 3-9 cm long and 8-15 mm wide, the apex acute and apiculate, the base narrowed into a short petiole, the margin serrate, the blunt teeth at first tipped by subulate multicellular hairs, coriaceous (leathery) in texture, the upper surface of young leaves sometimes slightly hairy and with the midrib pubescent, older leaves glossy, dark green and glabrous with impressed venation on the upper surface and paler on the undersurface. Adult leaves are rarely broader than 1 cm although leaves developed at the beginning of a year's growth may be short and broadly elliptical. Flowers are rather crowded in dense terminal panicles or racemes to 4 cm long in the axils of the uppermost leaves of the branchlets, the peduncles usually shorter than the leaves, subtended by broadly ovate, concave, sheathing, fimbriate, 2-3 mm long bracts and similar but shorter, 1-2 mm long bracteoles. Pedicels are shortly pubescent with whitish hairs. The calyx is 5-lobed, becoming enlarged and succulent in fruit. Sepals or calyx lobes are ovate, acute, 2-3 mm long at anthesis but quickly enlarging, shortly united at base. The corolla is broadly urceolate, 4-5 mm long, shortly 5-lobed with bluntish recurved lobes about 1.5 mm long, white to pale pink. Stamens 10, not exceeding corolla, with filaments abruptly dilated at base. Anthers are 2-lobed, each lobe tipped by two erect awns, dehiscing by terminal pores. The fruiting calyx is 6-8 mm long or more, the segments largely fused, succulent and snow-white in colour, forming a berry-like structure or false fruit 8-10 mm in diameter which encloses the true fruit. The enclosed fruit is a capsule with a dry pericarp, 4 mm in diameter, which dehisces through 5 valves. Seeds are numerous, irregularly shaped, about 0.7 mm long and pale brown. Flowers in Victoria around December and massive false fruit production by the Victorian population in February (SAC 1999; VicFlora 2015).

Generation Length

The generation length of *Gaultheria hispida* is inferred to be 35 to 50 years. This is based on a longevity that is likely to exceed 50 years. It is also based on the observed behaviour of the taxon in Tasmania where it tends to occupy sites of natural disturbance such as landslips or storm damaged sites.

Distribution

The taxon is known in Victoria only by a collection on 21 February 1994, from near Hopetoun Falls on the upper Aire River within the Aire Valley Plantation near Beech Forest in the Otway Ranges (SAC 1999; VicFlora 2015). The roadside situation of the small population of the taxon raises the possibility that it has become established at the site following road-works, probably from seed inadvertently imported from Tasmania. Other records from eastern Victoria are historical collections of doubtful location given the lack of subsequent records at these locations (VicFlora 2015).

At the time of monitoring in late 1994, the population at this site comprised of 7 mature fertile plants, each of 1-2m height, all of which had apparently germinated in natural undisturbed topsoil above the embankment of the road cutting, but within 2m of the cutting (SAC 1999). It is reasonable to assume that *G. hispida* is in fact likely to be indigenous to the Australian mainland, with circumstantial evidence to suggest that at least one other population has persisted in the area at least until the early nineties (SAC 1999).

Habitat

The Hopetoun Falls population is confined to a disturbed roadside remnant of Wet Forest (Wet Sclerophyll Forest or Tall Open-forest) which at maturity is dominated by *Eucalyptus regnans* (Mountain Ash), *E. obliqua* (Messmate Stringybark) or *E. viminalis* ssp. *viminalis* (Manna Gum) with an understorey dominated by broad-leaf mesophytic species such as *Hedycarya angustifolia* (Austral Mulberry) and *Olearia argophylla* (Musk Daisy-bush).

As a result of the disturbed history of the site, which is enclosed within an extensive softwood plantation, the immediate habitat of the population is a secondary community dominated at present by 5-8m tall *Nematolepis squamea* ssp. *squamea* (Satinwood), which has an estimated projective cover of 50%. Associated subdominant canopy species are 4-8m tall *Acacia melanoxylon* (Blackwood) and *Prostanthera lasianthos* (Victorian Christmas-bush) which each have an estimated projective cover of 5-25% (SAC 1999).

There are also scattered *Pittosporum bicolor* (Banyalla) and *Leptospermum continentale* (Prickly Tea-tree). *Tetrarrhena juncea* (Forest Wire-grass) is conspicuous in the understorey. Terrestrial and epiphytic cryptogams are well represented and locally abundant with the most prominent being *Ptychomnion aciculare* (Pipe-cleaner Moss) and a taxon of *Thuidium* (Weft Moss). The road gutter and the base of the embankment have been vigorously colonised by a suite of exotic herbs including *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire Fog), and *Ranunculus repens* (Creeping Buttercup) (SAC 1999).

Threats

The survival of the taxon in Victoria is dependent on the fate of a single known population. The population size is less than 10 mature plants, and is located on a roadside. Additionally, this population is highly exposed to the public since it is located at a public viewing point, with a carpark which is designed to attract tourists and other visitors (SAC 1999). This population is unreserved and could be easily eliminated by routine roadworks, such as reforming of the road batter, road realignment to reduce the sharpness of the bend immediately downslope of the population, expansion of the parking facility to cater for growing visitor pressure, or the provision of picnic facilities at the lookout (SAC 1999).

The taxon is most prominent when in fruit in the late summer and autumn when visitor numbers are likely to peak, and is therefore a potential target for unwitting or unscrupulous collection. It has attractive foliage as well as attractive fruit and could be a target for horticultural collection of vegetative propagation material (SAC 1999).

In addition, there is circumstantial evidence that the taxon may have occurred in substantially larger numbers over a substantially larger area within the Otway Range bioregion at the time of settlement, and that the taxon has, by inference, undergone dramatic decline over the period of settlement of the district (SAC 1999).

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 B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

The taxon is estimated to be severely fragmented, as the only Victorian occurrence is highly disjunct from all interstate occurrences and therefore the probability of recolonisation, in the event of local extinction, is remote.

It is estimated to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above in response to a wide range of localised threats, including road works and collection by the public or for horticultural propagation.

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is severely fragmented, has 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above.

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 7 mature individuals.

The number of mature individuals is inferred to continue to decline, the number of mature individuals in each subpopulation is 50 or fewer, and the percentage of mature individuals in one subpopulation is 90-100 %.

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 D as Critically Endangered

The taxon is estimated to have 7 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.

SAC (1999). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 492 *Gaultheria hispida.*

Walsh, N.G. (1996). Mimosaceae. In N.G. Walsh and T.J. Entwisle (Eds.), *Flora of Victoria Vol. 3, Dicotyledons Winteraceae to Myrtaceae.* Melbourne: Inkata Press.

VicFlora (2015). Flora of Victoria, Royal Botanic Gardens Victoria: *Gaultheria hispida*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/60ac89b0-f0aa-476d-825d-fb59a32cd64f