Threatened Species Assessment

Sambucus australasica
Yellow Elderberry

Taxonomy

Sambucus australasica (Lindl.) Fritsch

The taxon is known to hybridize with *Sambucus gaudichaudiana* (White Elderbery) at, for example, the banks of the Snowy River near Orbost. Unvouchered site records of *S. australasica* at a number of sites distant from reliably vouchered records are likely to represent unusually tall, robust and suffruticose specimens of *S. gaudichaudiana* which can approach young *S. australasica* in vegetative characters. Some flowering specimens may also be misidentified through over-reliance on merity as a key character state to distinguish the two indigenous Victorian species. Whilst the flowers of *S. australasica* are mostly 3-merous and those of *S. gaudichaudiana* are mostly 4-merous (VicFlora 2018), inflorescences of mixed merity have been encountered (David Cameron pers. obs.) and may account for misdetermination, particularly in young regenerating stands which have yet to demonstrate their ultimate stature and canopy longevity.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* SAC (1992).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ace; C2a(i)

Species Information

Description and Life History

The taxon is an evergreen shrub or small tree to c. 5 m high, more or less glabrous. Leaves petiolate, mostly 6-25 cm long; leaflets 3 or 5, narrow-elliptic to oblanceolate, mostly 2-10 cm long and 4-30 mm wide, glabrous, apex acuminate, base cuneate or obtuse, sometimes asymmetric, margins serrate; petiole 2-10 cm long; petiolules 2-5 mm long. Inflorescences cymose panicles, 10-20 cm diam., much-branched; bracts ovate, to c. 1 mm long. Sepals usually 3, broad-ovate, to c. 1 mm long, glabrous; petals usually 3, 2.5-3 mm long, shortly connate, white. Drupe ovoid to globose, c. 5 mm long, yellow. The taxon flowers mainly October to March (VicFlora 2018).

Generation Length

The generation length of *S. australasica* is estimated to be 50 to 100 years. Although the similarly arborescent *S. nigra* has been reported to live for between 25 and 44 years (Atkinson & Atkinson 2002), longevity of the taxon is likely to exceed 100 years. Recruitment is likely to be continuous or opportunistic in response to localised disturbance events such as canopy gap creation and optimal seasonal conditions. It is likely to be largely independent of fire.

Distribution

In Victoria the taxon occurs in near-coastal areas of East Gippsland near Orbost and near Mallacoota Inlet near the NSW border, with recently identified disjunct western outliers on Wilsons Promontory. It also occurs in Queensland and New South Wales (VicFlora 2018). Unvouchered site records of the taxon at a number of sites distant from

reliably vouchered records are likely to represent unusually tall, robust and suffruticose specimens of *S. gaudichaudiana*, which can approach young *S. australasica* in vegetative characters. Site records from Mt Drummer, Jones Creek, the Upper Genoa, Back Break Creek NW of Orbost, Kalimna West near Lakes Entrance and Waratah Bay are likely to be referable to *S. gaudichaudiana*. A specimen collected in Boola Boola State Forest north of Morwell and determined as *S. australasica* is also likely to be referable to *S. gaudichaudiana*. It is unclear whether flowering specimens collected at Wilsons Promontory following recent wildfires which are predominantly 3-merous and therefore key to *S. australasica* are in fact vigorous resprouts from perennial tuberous rootstocks of *S. gaudichaudiana*, which display deceptively variable floral merity.

Habitat

The taxon occurs on the margins of Warm Temperate Rainforest (VicFlora 2018), typically in riparian sites. At Wilsons Promontory the taxon has been recorded at the margins of swamp thickets in post-fire regeneration.

Threats

Historically the taxon has undoubtedly suffered significant decline through habitat loss to intensive agriculture and urban development, particularly on the highly fertile alluvial flats of the Lower Snowy River valley and adjoining tributaries. Localised habitat loss to agriculture has undoubtedly also occurred on alluvial flats draining into Mallacoota Inlet such as on Dowell Creek and at Marshmead on Harrisons Creek in the Howe Range. The taxon continues to be threatened by incremental habitat loss and degradation in these districts in response to agricultural intensification on freehold land. Browsing damage by Sambar (*Rusa unicolor*) has been witnessed at Second Island in the estuary of the Snowy River and is a major current and emerging threat, especially given that Victorian occurrences typically comprise few individuals. Increasing fire frequency, drought intensity and reduced reliability and seasonality of average rainfall, which are projected to intensify with climate change, are also threats to rainforest species including *S. australasica*. Some occurrences are also threatened by weed invasion as illustrated by the narrow stand at the Devil's Backbone at Lochend on the west bank of the Snowy River at which 16 exotic weeds were recorded in 1977 including the aggressive transformer weeds *Solanum pseudocapsicum* (Madeira Winter-cherry), *Tradescantia fluminensis* (Tradescantia) and *Vinca major* (Blue Periwinkle). The taxon is further threatened by its dependence on Warm Temperate Rainforest, a threatened community in continuing decline in response to increasing frequency, intensity and landscape scale of both wildfire and anthropogenic fire across the region.

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 Critically Endangered

The population reduction over the past 150 to 300 years is estimated to be 50 to 80%, based on (a), (c) and (e) above.

At least a third of the Victorian population of the taxon occurs in the Lower Snowy River valley, and around 90% of the potential habitat of the taxon at the time of European settlement is likely to have been cleared for intensive agriculture or urbanisation in this district. The taxon has undoubtedly suffered similar localised habitat loss to agriculture on Dowell Creek and at Marshmead on Harrisons Creek in the Howe Range near Mallacoota Inlet. Circumstantial observations suggest the taxon has become locally extinct at a number of sites such as the Lower Brodribb where last collected by Ferdinand von Mueller in the 19th century. A single plant was recorded by David Cameron at the Palms Track bridge on Cabbage Tree Creek in 1977 but this occurrence has not been relocated since despite several targeted searches. The taxon is believed to have 61% of its 18 Victorian sites occurring within the footprints of the 2019/20 wildfires, and at least part of its habitat was burnt at high severity. It is believed to be fire sensitive in the context of these fires and although the impacts of the fires are yet to be determined, it is likely that the taxon suffered some mortality, directly as a result of the fires or from post-fire impacts.

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 Endangered

The Extent of Occurrence across the taxon's range is estimated to be between 980 to 1,100 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA). The upper bound includes recent records at Wilsons Promontory.

It is estimated to be severely fragmented. *Sambucus* spp. produce drupes that are dispersed by birds (Atkinson & Atkinson 2002) and so it is likely that seed of this taxon is able to disperse between occurrences in any one district, potentially allowing the taxon to recolonise sites within a district in the event of local extinction. However, it is considered severely fragmented at the subregional scale since the three Victorian subpopulations are isolated from each other at distances likely to exceed the dispersal range of the taxon.

It is estimated to have 3 locations. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, in response to the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 56 to 64 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 3 locations, is severely fragmented and has a continuing decline in (i), (ii), (iii), (iv) and (v) (iii) 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 C as Critically Endangered

The taxon is estimated to have 130 to 270 mature individuals. Estimates of numbers given with records range from 10 to 15 plants. If it is assumed that this is an average size for individual occurrences, then multiplying this average by the 13 to 18 occurrences in Victoria gives 130 to 270 plants.

Despite a lack of longitudinal monitoring of individual occurrences, the taxon is confidently subject to continuing decline in response to the current and projected impact of the identified threats.

The number of mature individuals in the largest subpopulation is estimated to be 30 to 45 plants.

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 Endangered

The taxon is estimated to have 130 to 270 mature individuals.

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

References

Atkinson, M.D. and Atkinson, E. (2002). *Sambucus nigra* L. *Journal of Ecology* 90: 895-923.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014*. Department of Environment and Primary Industries, Melbourne.

SAC (1992). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 209 *Sambucus australasica*. Department of Environment and Primary Industries, Victoria.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Sambucus australasica. Retrieved from* https://vicflora.rbg.vic.gov.au/flora/taxon/e5540f54-727e-4467-8276-8ef8576e913f