Threatened Species Assessment

Santalum obtusifolium
Blunt Sandalwood

Taxonomy

Santalum obtusifolium R. Br.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria B1ab(iii)+2ab(iii); D

Species Information

Description and Life History

Erect shrub to c. 2.5 m high; branchlets angular-striate, glabrous. Leaves opposite, linear to lanceolate or elliptic, 3-6.5 cm long, 2-15 mm wide, obtuse or acute, margins recurved to revolute, surfaces discolorous (pale beneath); petiole 1-5 mm long. Inflorescences 1-6-flowered axillary umbel-like clusters; peduncle 4-10 mm long; pedicels c. 1 mm long. Receptacle 2-3 mm long; tepals 4, triangular-ovate, 1.5-2 mm long, obtuse, whitish, caducous; basal hair tuft dense; disc with prominent oblong lobes; style c. 3 mm long, stigma 4-lobed. Drupe broad-ellipsoid, 6-8 mm diam., subsessile, blue or purplish, style base persistent; endocarp smooth. Flowers Nov.-Jan. (VicFlora 2017).

Generation Length

The generation length of *Santalum obtusifolium* is estimated to be 30 to 50 years. Heartwood formation has been reported to be at its maximum between 30 and 50 years of age in *Santalum album,* which is a tree species (Burdock and Carabin 2008). This taxon will live for longer than this, but will start to decline after this period. As a shrub, *S. obtusifolium* may be expected to reach full size and maturity earlier and may live for a shorter period than *S. album*, perhaps dying soon after 50 years.

Distribution

In Victoria the taxon is known from the Genoa River, possibly the Brodribb River, the edges of Mallacoota Inlet and Gabo Island. Also in Queensland and New South Wales.

Habitat

Granitic rocky areas in riparian forest and sclerophyll forest or Melaleuca armillaris woodland.

Threats

Threats include increased frequency and intensity of fire (*S. obtusifolium* is killed by fire) and prolonged droughts. Both these events are expected to be exacerbated by climate change. Damage to plants by Sambar deer rubbing and browsing is also an issue, with such damage visible at some sites. Subpopulations around Mallacoota Inlet are threatened by increased salination due to likely increased water level of Mallacoota Inlet caused by future lack of freshwater flow to disrupt lagoon closure from sandbar formation, and sea level rise. Occasional flood events have the potential to dislodge plants along the Genoa River where plants grow close to the river's edge.

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. There is insufficient evidence to determine whether will be a future reduction in population size (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 B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,672 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

It is estimated to have 2 locations, Genoa River and Mallacoota Inlet. These areas are subject to different threatening processes (e.g. floods dislodging plants along the Genoa River and increased salination at Mallacoota Inlet).

It has a continuing decline in (iii) above, based on the impacts of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 48 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 2 locations and has a continuing decline in (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:

Ineligible under Criterion C

It is estimated that there are 110 to 150 mature individuals, but other thresholds under this criterion have not been met.

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

Based on the estimates of the number of mature individuals at sites reported with herbarium specimens, the average size of subpopulations is between 8 and 10 plants. If all 14 to 15 subpopulations have around this many plants the total population is estimated to consist of between 110 and 150 mature individuals.

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

References

Burdock, G.A. and Carabin, I.G. (2008). Safety assessment of sandalwood oil (*Santalum album* L.). *Food and Chemical Toxicology* 46: 421-432.

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

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VicFlora (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Santalum obtusifolium.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/1243ee6d-db60-44d1-ab41-3181a1137634