Threatened Species Assessment

Allocasuarina grampiana
Grampians Sheoak

Taxonomy

Allocasuarina grampiana L.A.S. Johnson

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a long-lived dioecious shrub to c. 4 m high, resprouting after fire with separate male and female plants. Reproduction by seed only. Plants obligate outcrossing (separate male and female plants), wind-pollinated. Female cones ripen c. 6 months after flowering and a large canopy-stored seedbank accumulates; individual cones persist for some years (but precise time undocumented). The cones release seed when they dry out. Branchlets are characterized by young articles with a strong waxy bloom, angular to rounded ribs and erect teeth. The cones are narrow and often quite elongate, and have a sterile terminal portion.

Generation Length

The generation length of *Allocasuarina grampiana* is suspected to be 50 to 70 years. This is based on the taxon's longevity and episodic fire-stimulated recruitment, and, implicitly, the recruitment fire interval.

Distribution

The taxon is restricted to the Grampian Range in western Victoria. It is locally common on rocky peaks of the Mt William, Serra and Victoria Ranges.

Habitat

The taxon occurs as a co-dominant shrub in heathy and shrubby woodland, up to 1160 m above sea level, on very rocky sites with abundant outcropping Siluro-Devonian sandstone. The soils are well drained sands on sandy loam.

Threats

The taxon is threatened by too frequent fire, climatic drying and warming leading to extreme drought stress, habitat loss and fragmentation, and most importantly, by weed invasion, in particular *Acacia longifolia* s.l. It is thought to be susceptible to habitat damage caused by *Phytophthora cinnamomi* (Cinnamon Fungus) (Keah et al. 2012), but most populations occur at higher altitudes so the effects may not be as severe as they would be at lower.

Notably, *Allocasuarina robusta* (a South Australian endemic) was shown to be highly susceptible to Cinnamon Fungus.

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 A3 as Vulnerable

The population reduction over the next 100 years is suspected to be 10 to 30%, based on (c) and (e) above.

Future decline is based on the projected impacts of the suite of threats identified, particularly weed invasion, susceptibility to *Phytophthera ciinnamomi,* and reduced recruitment capacity due to climate change.

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 1,121 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, and is inferred to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the current and projected impact of the identified threats, particularly weed invasion and reduced recruitment capacity due to climate change.

There are multiple, small isolated subpopulations that are all at risk from suite of threats, particularly weed invasion, such that there is increased extinction risk and little or no probability of recolonisation should subpopulations become extinct.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 120 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is estimated to be 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:

Ineligible under Criterion C as Data Deficient

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

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