Threatened Species Assessment

Casuarina obesa
Swamp Sheoak

Taxonomy

Casuarina obesa Miq.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2014).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2abce+3ce+4abce

Species Information

Description and Life History

Freely root-suckering and able to form extensive copses. Trees to c. 15 m high. Branchlets drooping or spreading, to 21 cm long; internodes 8-20 mm long, c. 1 mm diam., smooth, usually waxy; ribs flat or slightly rounded. Teeth 12-16, erect on new shoots, then occasionally spreading slightly, but soon breaking off. Male spikes 1.5-6 cm long, 7-10 whorls per cm. Cones sessile or on peduncle to 10 mm long, cylindric; cone body 10-22 mm long, 8-12 mm diam. Winged seeds 3-5 mm long. Flowers are seldom seen (VicFlora 2017).

Generation Length

The generation length of *Casuarina obesa* is inferred to be 50 to 300 years (midpoint 150 years). This is a long-lived tree once it is a mature adult. There has been a general failure at sexual reproduction (i.e. by seed) and seedlings are not known. Mature plants may readily sucker but not at all sites, and this is the principal means of reproduction currently. Cones are developed, but seed set is rare as sites may be clones and distant from other sites. The number of years between successful suckering and a sucker producing the next sucker is not precisely known, but it is likely to be not less than 10 years.

Distribution

In Victoria, *C. obesa* is restricted to Karadoc Swamp in the Mallee region near Mildura, a small scattering of sites in the central to western Wimmera, and a couple of sites in the nearby Northern Plains, to just south-west of Echuca. In addition to these natural occurrences, it has been planted in widely scattered localities throughout western and northern Victoria, from just inland of the Otway Ranges to south-east of Echuca.

Habitat

Swamp Sheoke often occupies distinctive niches, such as low lying seasonal swampy flats only just above high water level, on limits along river banks only 20-40m wide, and inland on the edge of salt lakes. In these last areas it may grow as pure, dense thickets, or as the principal large shrub or smalltree with other trees. The area in Western Australia where Swamp Sheoke grows consists mainly of plains and gently undulating topography. The soils include a wide range of sands and silts, with pink granitic sands, stony red soils, red clay loams, and swampy soils recorded.

Threats

The main threats to this restricted taxon are increased salinity, grazing, cropping and cultivation, and lack of sexual reproduction.

Occurrences are concentrated at the edges of salt lakes (evaporative basins) or at the uppermost margin of peak flooding along the Murray River, e.g. at Karadoc. All of these sites are subject to increasing salination as peak freshwater floods have been eliminated, and the general/regional saline ground water table has been rising. Sites have become dangerously and terminally salinized for this taxon, and are increasingly unable to support even sucker regrowth.

The majority of sites are grazed by stock, and feral and native animals. Grazing causes ground compaction, introduces weed species, and causes damage to resident native trees and seedlings. *Casuarinas* are generally highly palatable, and it is likely that seedlings would be browsed heavily by stock. To further compound the problem, cropping and cultivation occur at these sites and/or adjacent to them, which alter soil nutrition and moisture levels, and therefore could affect the remaining trees and their prospects for regeneration.

Lack of regeneration by sexual means and limited asexual regeneration are major issues for the taxon's survival in Victoria. Regeneration is possible from seed or suckering, however there appears to be little or no viable seed produced from any of the populations, presumably due to the poor health of the trees and separation of the sexes at some sites. The larger populations in the Wimmera consist of two apparently unisexual stands of the opposite sex, separated by approximately 4.5km. Sexual reproduction is therefore severely limited.

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 900 years is estimated to be 70 to 85% (midpoint 80%), based on (a), (b), (c) and (e) above.

This is based on an assessment of the extent of land clearance for cropping, loss of suitable habitat, and recent salinization. Sites at which the taxon formerly occurred are now known to lack trees, and observations over the last couple of decades from a number of reliable field observers confirm that the taxon is in serious decline in a number of its sites.

The causes of the reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is projected to be 90 to 100% (midpoint 95%), based on (c) and (e) above.

On the basis of the lack of sexual reproduction, the current fragmented habitat, and past and current habitat trajectories, it is possible that the taxon will decline to extinction in the wild.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 150 to 900 year period, including both past and future (up to 100 years in the future), is projected to be 95 to 100% (midpoint 98%), based on (a), (b), (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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 B as Endangered

The Area of Occupancy (AoO) is estimated to be 88 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, has 1 location, and has 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

It is suspected that there are 13 to 4,000 (midpoint 3,000) mature individuals, but this qualifier is too weak.

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 D2 as Vulnerable

The taxon is projected to be very restricted.

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

References

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