Threatened Species Assessment

Senna artemisioides subsp. *artemisioides*
Silver Cassia

Taxonomy

Senna artemisioides subsp. *artemisioides* A. Cunn. ex Lindl.

This taxon has also been referred to as *Senna* form taxon *'artemisioides'*.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ce+4ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C1+2a(i,ii); D

Species Information

Description and Life History

The taxon has an overall silvery appearance. Petiole terete, 6-15 mm long; leaflets in 3-8 pairs, terete or linear and tightly inrolled, mostly 15-25 mm long, c. 1 mm diam., sparsely to densely covered with straight or woolly hairs. The taxon flowers in winter and spring (VicFlora 2019).

Generation Length

The generation length of *Senna artemisioides* subsp. *artemisioides* is estimated to be 50 to 80 years. This is based on field observations of the only confirmed extant Victorian occurrence. These very long-lived, older plants were estimated in 2004 to be at least 40-50 years old. Whilst the pre-European settlement recruitment mode for Victorian occurrences is unclear, it is likely that recruitment is both episodic in response to rare fire events and opportunist in response to localised site disturbance events.

Distribution

The taxon was previously known in Victoria from a few pre-1900 collections at Benjeroop near Swan Hill, Echuca district and 'the Wimmera'. It was rediscovered east of Ouyen in 2004 (VicFlora 2019).

Habitat

The taxon occurs on a low dune with mallee vegetation (VicFlora 2019).

Threats

The taxon is threatened by extreme fragmentation within agricultural landscapes. Surviving occurrences are at risk from roadside management, fire management activity, livestock agistment, weed invasion and the increasing risk of recruitment failure and seedbank depletion and exhaustion in response to extreme drought stress.

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 240 years is inferred to be 80 to 95%, based on (c) and (e) above.

Past decline is inferred from the likely extinction of the taxon at Benjeroop near Swan Hill and in the Echuca district and the inference that the only extant occurrence, or occurrences, occur on road verges in highly fragmented agricultural landscapes.

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

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 150 to 240 year period, including both past and future (up to 100 years in the future), is inferred to be 50 to 99%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

As stated above, the taxon is likely to be extinct at some sites and confined to roadsides in a fragmented landscape.

The magnitude of future decline cannot be estimated with any confidence or specificity since the identified threats operate stochastically and with unpredictable intensity. However, this estimate is based on the projected impact of the identified threats.

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 12 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 the AoO as an area within the EoO.

The taxon is estimated to be either a) severely fragmented anthropogenically at the landscape scale or b) if only one Victorian occurrence is indigenous, severely fragmented as it is highly disjunct from all interstate occurrences. The probability of recolonisation, in the event of local extinction, is remote

It is estimated to have one 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..

Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. It is severely fragmented, has one 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 C1 as Critically Endangered

It is estimated that there are 4 to 10 mature individuals. Field observations suggest that only 4 of 45 plants observed near Kulwin in 2008 were over one metre high, and interpretable as adult individuals. When first discovered at this site in 2004, approximately 10 plants were recorded along 50 metres of road reserve. A single plant collected in 2009 at 'Vinifera Forest' between Nyah and Vinifera, also on a road verge, is either a natural occurrence or a garden escape.

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 4 to 10 mature individuals. The number of mature individuals is estimated to continue to decline. The number of mature individuals in each subpopulation is 50 or fewer. 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 4 to 10 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.

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

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Senna artemisioides* subsp. *artemisioides.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/900c3ef6-bd94-458b-8980-bbcd1b37a1d7