Threatened Species Assessment

Calystegia soldanella
Sea Bindweed

Taxonomy

Calystegia soldanella (L.) 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

Criterion B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

Glabrous perennial with trailing or rarely twining stems. Leaves more or less reniform, 1.5-4 cm long, 2-6 cm wide, somewhat fleshy, apex rounded to emarginate, often mucronate, base cordate, margins undulate; petiole 1-6 cm long. Flowers with peduncles 1.5-7 cm long, as long as or longer than petioles; bracteoles broad-ovate, 1-1.5 cm long, apex obtuse or rounded, slightly shorter than the calyx; sepals 0.8-1.6 cm long; corolla 3-5 cm long, white, pink or purplish. Capsule ovoid, 12-15 mm long, acute. The taxon flowers in spring and summer (VicFlora, 2019).

Generation Length

The generation length of *Calystegia soldanella* is estimated to be 15 to 45 years. This is based on an estimated longevity of 15-25 years, and the likelihood that the taxon recruits sporadically and opportunistically in response to seasonal conditions from a long-persistent soil-stored seedbank. The paucity of site and specimen records, and the consistently low population densities observed in the field, suggest that recruitment is a naturally rare event for reasons which are not self-evident, given the extent of apparently suitable unoccupied habitat.

Distribution

The taxon is restricted to coastal sites, mostly eastward from Lakes Entrance, with isolated westerly records for Apollo Bay, Wilsons Promontory and Walkerville. The taxon is also found in Queensland, New South Wales (including Lord Howe Island), and Tasmania (VicFlora, 2019).

Habitat

The taxon is an uncommon sand-binding trailer of coastal dunes (VicFlora, 2019).

Threats

The taxon is a habitat specialist that is reliant on calcareous or siliceous coastal dunes for its persistence, which are threatened by foredune and beach erosion of the seaward edge of primary dunes by storm surges. These threats are projected to increase in frequency and intensity in response to climate change and sea level rise.

The taxon is also threatened by highly competitive, invasive, exotic environmental weeds such as *Euphorbia paralias* (Sea Spurge), *Cakile* taxa (Sea Rocket), *Senecio elegans* (Purple Groundsel), *Coprosma repens* (Mirror Bush), and the grasses *Ammophila arenaria* (Marram Grass), *Cenchrus clandestinus* (Kikuyu) and *Lagurus ovatus*

(Hare's-tail Grass). Each of these exotics has the capacity to transform the habitat of *C. soldanella,* and each is classed as a transformer weed. Any one of these taxa alone can successfully exclude *C. soldanella*, which cannot tolerate strong competition for light and space, and is almost never found in any competitive environment, typically occurring in unoccupied sites on primary beach dunes. In the past, the seaward edge of primary dunes has been the habitat typically colonised by *Cakile maritima* subsp. *maritima* (Sea Rocket) and *C. edentula* (American Sea Rocket). Sea Spurge is currently progressing eastward along the coast of Victoria, forming dense monocultures which exclude all other plant taxa, as it has in Western Australia, South Australia and northern Tasmania.

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

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

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 Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 9,950 km^2, based on 2 x 2 grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented naturally at the regional and landscape scales. All known occurrences are isolated from each other at spacings greatly exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. This precludes the possibility of recolonisation in the event of local extinction.

It is estimated to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the identified threats, which include storm surges and competition with exotic weeds.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 52 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

As above, the taxon is 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:

Eligible under criterion D2 as Vulnerable

The taxon is estimated to be very restricted.

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.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Calystegia soldanella*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/0dd3a3aa-bde9-4eeb-8008-cadbf1ca98f1