



Swainsona microphylla Small-leaf Swainson-pea

Taxonomy

Swainsona microphylla A. Gray

Willis (1973) noted that Victorian populations are apparently all referable either to subsp. *tomentosa*, having a dense pubescence of stiffly spreading hairs, or to subsp. *minima* with short close-appressed hairs and very small leaflets (only 1.5-4 mm. long).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2ce+4ce; B2ab(i,ii,iii,iv,v)c(iv)

Species Information

Description and Life History

The taxon is a prostrate, decumbent or ascending perennial herb, to c. 60 cm tall; stems sparsely or densely pubescent with appressed or spreading basifixed hairs, sometimes virtually glabrous. Leaves mostly 5-15 cm long; leaflets mostly 21-41, broad-cuneate to orbicular, 1-5 mm long, 1-5 mm wide, apices usually retuse, often mucronate, both surfaces glabrous to pubescent, often deciduous; stipules 1-4 mm long, broad at base, apex lanceolate and acuminate. Racemes mostly 10-25-flowered; flowers 5-10 mm long; calyx glabrous to pubescent, teeth usually much shorter than tube; petals white, pink or purple; standard 6-8 mm long, 6-9 mm wide, broad-ovate, tapered at base or clawed; keel 4.5-7 mm long, narrow-obtuse, apex rounded or beaked; style tip truncate with an arc of stiff hairs behind. Pod globular to broad-obloid, mostly 5-10 mm long, 3-8 mm wide, inflated, glabrous, stipe to c. 1 mm long; seeds to c. 8, cordate, c. 1.5 mm long, olive-green to brown. The taxon flowers from June to October (VicFlora 2019).

Generation Length

The generation length of *Swainsona microphylla* is estimated to be 15 to 50 (midpoint 30) years. This is based on a plausible longevity of 25 years or more and the likelihood that the taxon recruits episodically from a long-persistent soil-stored seedbank following flood or fire at pre-settlement intervals of 5-45 years or more, depending on habitat and landscape context. The taxon is also likely to resprout from the rootstock following optimal flood and mild fire events and, with lower confidence, close browsing by herbivores. Recruitment is also cued by localised small-scale disturbance events or optimal seasonal conditions (continuous or opportunistic trickle recruitment).

Distribution

In Victoria the taxon is mainly confined to the far north-west but also near Echuca and on the upper Snowy River near Willis. The stronghold of the taxon in Victoria is in the immediate vicinity of Hattah Lakes within the Hattah-Kulkyne National Park, extending downstream along the Murray River to Boundary Point and Lindsay Island. Willis (1973) stated that in Victoria, the taxon is "not uncommon on sand hills and inundated sandy flats along the Murray Valley, from the extreme north-west upstream to Echuca (Mildura, Kulkyne Nat. Forest, Lower Campaspe R. etc.)."



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Charles Walter collected the taxon at Echuca in 1903 where, in the absence of further records over the last century, the taxon is now presumed long extinct.

The only support for the lower Campaspe River is a suite of four collections taken in 1875 and 1877 from the Campaspe River where, in the absence of further records in the last 140 years, the taxon is now also presumed long extinct.

The taxon is also found in Western Australia, the Northern Territory, South Australia, Queensland, and New South Wales (VicFlora 2019)

Habitat

The taxon grows mostly in light soils on sand-hills and sandplains (VicFlora 2019).

The taxon is frequently associated with *Eucalyptus largiflorens* (Black Box) or *E. camaldulensis* (River Red-gum) open woodland on alluvial flats subject to recurrent flooding or, alternatively, on stabilized sand dunes beyond the reach of floodwaters, sometimes supporting open woodland dominated by *Callitris gracilis* (Slender Cypress-pine). At Karadoc Swamp the taxon is associated with *Casuarina obesa* (Swamp Sheoak). Quadrat data indicates that other associated dominants include *Acacia ligulata* (Small Cooba), *Callistemon brachyandrus* (Prickly Bottlebrush), *Cyperus gymnocaulos* (Spiny Flat-sedge), *Dodonaea viscosa* subsp. *angustissima* (Slender Hop-bush), *Melaleuca lanceolata* (Moonah) and *Stemodia florulenta* (Blue Rod). Soils are typically sandy loam or loamy sand.

The highly disjunct specimens collected at Willis on the Victorian side of the NSW border occupy a burnt *Callitris glaucophylla* woodland on a west-facing slope, on shallow rocky granite-derived soil at an elevation of 290 m in association with *Austrostipa scabra*, *Petrorhagia nanteuillii*, *Sida corrugata*, *Trifolium arvense* and *Vittadinia cuneata*.

Threats

The taxon has suffered severe depletion, particularly in the Mildura and Red Cliffs districts, through habitat loss to agriculture and urban development and habitat degradation through agricultural and other land management practices including heavy continuous grazing and cultivation, roadside management, and fuel reduction measures such as ploughed mineral-earth firebreaks.

The taxon is likely to be palatable to at least some herbivores and may therefore be subject to browsing by rabbits, kangaroos, wallabies, goats, sheep, and cattle. Cunningham *et al.* (1992) notes, however, that all subspecies recognised in NSW, all of which these authors list as Poison Pea, appear to be unpalatable and have been suspected of poisoning stock, although the evidence is not strong. The capacity of rabbit populations to rapidly respond to favourable seasons in synchrony with optimal conditions for recruitment and seedset of *S. microphylla* may pose the most significant current and projected threat to the taxon. It is therefore conservation dependent on the long-term impact of herbivory, since rabbit numbers are highly dependent on the success of a succession of rabbit control programs in the region using various control strategies.

It is also threatened by weed invasion by both perennial and annual exotics, and many occurrences are threatened by incremental habitat loss and habitat degradation in response to agricultural intensification. A significant proportion of occurrences are dominated by exotic weeds such as *Brassica tournefortii* (Mediterranean Turnip), *Bromus rubens* (Red Brome), *Chondrilla juncea* (Skeleton Weed), *Echium plantagineum* (Paterson's Curse), *Hypochaeris glabra* (Smooth Cat's-ear), *Medicago minima* (Little Medic), *Pentameris airoides* (False Hair-grass), *Reichardia tingitana* (False Sow-thistle), *Salsola tragus* subsp. *tragus* (Prickly Saltwort), *Silene apetala* (Mallee Catchfly), *S. longicaulis* (Portuguese Catchfly), *S. nocturna* (Mediterranean Catchfly) and *Vulpia myuros* (Rat's-tail Fescue).

Climatic drying and warming may also increase the risk of recruitment failure and adult mortality in response to extreme drought stress, resulting in seedbank depletion and local extinction.

Occurrences in Black Box or River Red-gum woodland subject to recurrent flooding are further threatened by reduced reliability of flooding, resulting from water diversion for irrigation, ecologically unfavourable environmental water allocation regimes, and saline water discharge.

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%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>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.</p> <p>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]</p> <p>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.</p> <p style="text-align: center;"><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (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 Endangered

The population reduction over the past 45 to 150 years is estimated to be 50 to 70% (midpoint 60%), based on (c) and (e) above.

Past reduction is based on habitat loss to agriculture and urban development in some districts, habitat degradation in response to a wide range of management practices, and the significant impact of rabbit browsing.

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

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 45 to 100 years is estimated to be 20 to 40% (midpoint 30%), based on (c) and (e) above and on the projected impact of the identified current and future threats.

Eligible under Criterion A4 as Endangered

The population reduction over any 45 to 150 year period, including both past and future (up to 100 years in the future), is estimated to be 40 to 65% (midpoint 50%), based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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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 (EEO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 9,903 km², based on 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 and anthropogenically at the landscape scale, with all geographically isolated occurrences at separations exceeding the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal. The only plausible vectors are ants (myrmecochory) which operate at the metre scale (Berg 1975) and the possibility of some downstream dispersal by floodwaters within the flood zone.

It is estimated to have 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) based on the impacts of the identified threats.

It is estimated to have extreme fluctuations in (iv) above in at least a proportion of the population, in response to fluctuation in flood intensity, frequency, and duration, determined by alternating La Niña and El Niño events.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 167 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

As above, the taxon is severely fragmented, has 3 locations, and has a continuing decline in (i), (ii), (iii), (iv) and (v) and extreme fluctuations in (iv) above.

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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 no available estimate of population size for the taxon in Victoria.

Criterion D. Very small or restricted populations				
		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: AaO < 20 km ² 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

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