

## *Swainsona phacoides* Dwarf Swainson-pea

### Taxonomy

*Swainsona phacoides* Benth.

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2002).

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

### Proposed conservation status

Endangered in Victoria

Criterion B2ab(i,ii,iii,iv)

### Species Information

#### Description and Life History

The taxon is a prostrate or ascending slender perennial or ephemeral herb, to 30 cm tall. Stems often densely pubescent with asymmetric medifixed hairs; hairs 1-1.5 mm long, appressed or with both ends raised. Leaves mostly 5-10 cm long; leaflets 5-13, narrow- to broad-elliptic, leaflets 5-30 mm long, 1-5 mm wide, apices acute to obtuse or emarginate, both surfaces densely to sparsely pubescent; stipules to c. 5 mm long. Racemes 1-10-flowered; flowers mostly 10-15 mm long; calyx densely pubescent, teeth longer or shorter than tube; petals pale to dark reddish-purple; standard usually 7-14 mm long, 7-14 mm wide, broad-ovate to suborbicular, tapering to base; keel 8-10 mm long, longer than wings, apex acute to obtuse; style tip slender and straight. Pod obovoid to obloid, 10-30 mm long, 4-12 mm wide, inflated, with long, fine spreading tubercle-based hairs; stipe to c. 0.5 mm long; seeds to c. 40, cordate, c. 1.7 mm long, olive-green to brown. Flowers mainly from August to October (VicFlora 2017).

*Swainsona* species are largely renascent perennials, resprouting in suitable conditions from a persistent rootstock. This gives individual plants the capacity to persist between years given suitable conditions. Growth and flowering among most species of *Swainsona* appears to be stimulated by available moisture, thus plants are most frequently observable following adequate Spring rainfall. Plants are usually seen in the first spring following a fire. Soil disturbance will also often stimulate germination (DSE 2001).

All species observed in spring 1999 produced copious flowers and similarly abundant quantities of seed, though significant variation in flowering and seed production occurs according to seasonal conditions. Flowering and seed production is apparently only curtailed when plants begin to dry off from insufficient moisture (DSE 2001).

*Swainsona* species produce hard-coated seeds which frequently require some treatment to break dormancy. It is surmised that heat treatments, including fire or extreme soil temperatures, and physical disturbances such as soil scraping which can rupture the seed coat, are required in conjunction with moisture to stimulate germination (DSE 2001). Growth of *Swainsona* species appears to be more vigorous in sites with an open understorey, consistent with many native species in grassy ecosystems. Plants perform better in an environment where there are gaps in the herb layer, high light intensity and low competition from other plants (DSE 2001).

Despite the abundance of seed produced by *Swainsona* species, the incidence of recruitment by this means is believed to be irregular and not great. Scientific data specifically about persistence of viable seed-banks, and germination of *Swainsona* seed is limited (DSE 2001).

A study by Capuano (1993, cited in DSE 2001) gave some support to the idea that seed treatment or disturbance is a necessary precursor to seedling recruitment in *Swainsona* species. Scarlett and Parsons (1993, cited in DSE 2001) speculated that a gradual depletion of the soil-stored seedbank of *S. pyrophila* may be occurring in the absence of regular fires in its preferred habitat (DSE 2001).

## Generation Length

The generation length of *Swainsona phacoides* is inferred to be 5 to 25 years. This is based on the perennial forb habit and the observation that the taxon may persist through summer with favourable summer rain. It is also based on the likelihood that the taxon recruits from a long-persistent soil-stored seedbank in good seasons at intervals determined by La Niña and El Niño cycles.

## Distribution

The taxon occurs in all mainland states. It is rare in Victoria, mostly confined to the north-west downstream of about Echuca, associated with lakes or the Murray River, north-west Victoria. Collections from grassland or woodland from the Bendigo-Mitiamo are outliers geographically and ecologically (VicFlora 2017; SAC 2002). There have been no recent records from previously known localities in the Bendigo, Swan Hill and Kerang areas, with most plants now occurring in Huttah-Kulkyne National Park (SAC 2002). Isolated plants have been recorded near Robinvale and on Lindsay Island (DSE 2001).

## Habitat

The taxon occurs mostly on low dunes or sandy rises associated with lakes or the Murray River, occasionally on plains with heavier soils, rarely in deep sand Mallee (VicFlora 2017).

The taxon is largely confined to Semi-arid Herbaceous Cypress-Pine Woodlands with sandy, calcareous soils (DSE 2001). Structural dominants include Slender Cypress-pine *C. gracilis*, with scattered Buloke *Allocasuarina luehmannii* and Narrow-leaf Hop-bush *Dodonaea viscosa* ssp. *angustissima* (DSE 2001). Plants occur on stable dune ridges and slopes (DSE 2001).

## Threats

Key threats identified for this and other *Swainsona* spp. which occur in Mallee dune habitats include overgrazing by stock, rabbits and kangaroos, unpredictable rainfall and weed invasion by species such as *Brassica tournefortii* and *Bromus* spp., which can smother *Swainsona* spp. if they are allowed to grow unchecked (DSE 2001; SAC 2002).

The foliage and flowers of *Swainsona* spp. are highly palatable to grazing animals. Although *Swainsona* spp. are adversely affected by intense and continuous grazing by stock, rabbits or native herbivores, particularly in spring flowering and seeding periods, it appears that light grazing at other times in their lifecycle can benefit the plants (DSE 2001).

### 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>based on any of the following:</p>	<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>
--	---------------------------------------	---

### 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.

Whilst the taxon is likely to have suffered significant historic decline in response to habitat loss to agriculture, it is unclear what proportion of this decline has occurred within the last three generations. The magnitude of future decline cannot be estimated with any confidence since the identified threats are highly dependent on conservation management activity, and seasonal conditions which cannot be predicted with any confidence.

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 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 111 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is severely fragmented naturally at the subregional scale and anthropogenically at the landscape scale. Geographically isolated stands occur at separations that are likely to exceed the dispersal range of the taxon which has no specialised mechanism for long-distance dispersal.

It is estimated to have 3 locations. It has a continuing decline in (i), (ii), (iii) and (iv) above, based on the current and projected impact of overgrazing by stock, rabbits and kangaroos, unpredictable rainfall and weed invasion.

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				

# Swainsona phacoides

## Dwarf Swainson-pea

### Evidence:

#### Ineligible under Criterion C

It is inferred that there are 50 to 350 mature individuals, but this qualifier is too weak and other thresholds under this criterion have not been met.

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 km <sup>2</sup> 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

DSE (2001). Action Statement - Twelve threatened Swainson-peas and Darling-peas (Swainsona species) (No. 126). Department of Sustainability and Environment, Melbourne. Retrieved from: [https://www.environment.vic.gov.au/\\_\\_data/assets/pdf\\_file/0025/32596/Downy-Swainson-pea\\_Twelve\\_threatened\\_Swainson-peas\\_and\\_Darling-peas\\_Swainsona\\_species.pdf](https://www.environment.vic.gov.au/__data/assets/pdf_file/0025/32596/Downy-Swainson-pea_Twelve_threatened_Swainson-peas_and_Darling-peas_Swainsona_species.pdf)

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

SAC (2002). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 607 *Swainsona phacoides*. Department of Environment and Primary Industries, Victoria.

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Swainsona phacoides*. Retrieved from: <https://vicflora.rbg.vic.gov.au/flora/taxon/f967d3ae-2e58-4928-89a1-333d137acbf4>