Threatened Species Assessment

Polygala japonica
Dwarf Milkwort

Taxonomy

Polygala japonica Houtt.

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria A2bce+3ce+4ce; B2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a decumbent, wiry subshrub to c. 25 cm high; stems pubescent with tiny looping hairs. Leaves ovate to elliptic, 6–20 mm long, 3–10 mm wide. Flowers mauve in lateral racemes c. 1–2 cm long; bracts and bracteoles to 1 mm long, soon deciduous; pedicels 2–6 mm long; sepals free, the upper and lower ones narrow-ovate, 2–3 mm long, wings ovate to obovate, c. 5 mm long, 3–4 mm wide in fruit, 3–5-nerved with connecting lateral nerves; corolla 6–7 mm long, shortly exceeding sepals at anthesis, keel appendages c. 2 mm long, lateral petals entire, slightly shorter than keel. Capsule c. orbicular, emarginate at apex, c. 8 mm long and wide; seed hirsute, c. 3 mm long, with aril c. 2.5 mm long. Flowers mostly October–December (VicFlora 2014).

P. japonica is presumably relatively short-lived and fire sensitive, recovering from a soil-stored seedbank of unknown longevity, with reproduction by seed only. The breeding system is unknown but is probably routinely self-pollinating, and pollination is also assumed to be by insects for a floral reward. Recruitment is presumably continuous but is very likely pulsed after fire. The arillate seeds are presumably ant-dispersed, thus dispersal and gene-flow likely to be not more than tens of metres.

Generation Length

The generation length of *Polygala japonica* is suspected to be 10 to 20 years. This is based on its relatively short longevity and continuous recruitment and turnover.

Distribution

P. japonica occurs in eastern Victoria from lowlands to highlands, to around 800 m. The taxon is no longer extant at the majority of Victorian records.

Habitat

The taxon occurs in grassland and grassy woodland on relatively fertile soils derived from Tertiary and Quanternary sediments, and Tertiary basalt. The small plants occupy inter-tussock spaces. It is also recorded in *Eucalyptus pauciflora – E. rubida* woodland at Pheasant Creek Flora Reserve near Corryong (Carr 2018)

Threats

Threats to the taxon include the effects of climate change such as decreased rainfall, increased evaporation, and extreme temperatures; increased frequency of severe fires; impacts of fire-control activities; absence of fire in fire-dependent communities, particularly grassland and grassy woodland (i.e. maintenance of inter-tussock spaces is compromised); soil loss on bare post-fire substrates resulting from severe rainfall events; environmental damage to soils and vegetation by deer, especially Sambar Deer (*Rusa unicolor*), feral pigs, horses, and cattle, including illegal grazing as at Greens Hills Nature Conservation Reserve; licenced Red Gum firewood harvesting in Moormurng Flora and Fauna Reserve; damage to plants by off-road recreational vehicles; and weed invasion, including dispersal by cattle in faeces of very long-lived seeds of herbaceous annual and perennial weed taxa, notably Clovers such as *Trifolium arvense, T. campestre, T. dubium,* and *T. repens*.

At Deep Creek north of Benambra a very large population of *P. japonica* occurred and was documented by Carr and Mathews (unpublished data) in a quadrat survey around 2005. This was extremely high-quality *Themeda* open grassy woodland (Montane Grassland and Montane Grassy Woodland EVCs), but a subsequent bushfire resulted in massive recruitment and extremely high covers of weeds, particularly annual Clovers, as well as *Anthoxanthum odoratum* and annual grasses such as *Aira*. Because of the fire, the long-lived soil-stored seedbank of weeds increased by hundreds of orders of magnitude, especially *Trifolium,* effectively destroying this vegetation and populations of many VROT taxa. This public land had been legally grazed by cattle, with the *Trifolium* spp. etc. introduced and spread by seed in cattle dung.

Green Hills Nature Conservation Reserve in East Gippsland (Robertson and Fitzimons 2005) was also very high quality Montane Grassland/Montane Grassy Woodland with a good population of *P. japonica* and other VROT taxa (Prober and Thiele 1998; Carr unpublished data). Since acquisition it has been illegally cattle grazed, and weed invasions, notably *Rubus fruiticosus* spp. agg., *Hypericum perforatum,* and *A. odoratum*, have become widespread with little management, which has effectively annihilated *Polygala* and other VROT taxa populations (Carr unpublished data).

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 Endangered

The population reduction over the past 30 to 60 years is suspected to be 50%, based on (b), (c) and (e) above.

Past reduction is based on most subpopulations recorded historically being extinct. The massive threats identified have also caused the loss of probably numerous subpopulations.

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 30 to 60 years is suspected to be 50%, based on (c) and (e) above.

Future reduction is based on the projected impacts of the suite of threats identified.

Eligible under Criterion A4 as Endangered

The population reduction over any 30 to 60 year period, including both past and future (up to 100 years in the future), is inferred to be 50%, based on (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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 108 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is projected to be severely fragmented considering its limited dispersal ability, the barriers to dispersal, and the lack of habitat separating individuals.

It is inferred to have a continuing decline in (i), (ii), (iii), (iv) and (v) above due to the identified threats, such as climate change, grazing, 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				

Evidence:

Ineligible under Criterion C as Data Deficient

There is no population information for this taxon as there have been no dedicated surveys undertaken.

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

Carr, G.W. (2018). *Pheasant Creek Flora Reserve - Vegetation, flora, significance and management issues.* Unpublished report prepared for Koetong Landcare Group. Fairfield, Ecology Australia.

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014.* Department of Environment and Primary Industries, Melbourne.

Prober, S. & Thiele, K. (1998). *Establishment and management of the "Grassy White Box Woodlands Reserve".* Final Report to Environment Australia, Canberra.

Robertson, H., and Fitzimons, J. (2005). *Green Hills Nature Conservation Reserve Management Statement.* Department of Sustainability and Environment, Victoria.

VicFlora (2014). Flora of Victoria, Royal Botanic Gardens Victoria: *Polygala japonica.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/9d1bb4ec-2789-4201-9db6-ca13d487a52a