Threatened Species Assessment

Goodia pubescens
Silky Golden-tip

Taxonomy

Goodia pubescens Sims

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criterion B2ab(iii)

Species Information

Description and Life History

The taxon is a shrub or slender tree to 2 m high; young branchlets densely clothed with appressed or spreading hairs. Leaflets obovate to obovate-cuneate or elliptic, the terminal one usually obovate, 10-40 mm long, 6-20 mm wide, with scattered hairs on both surfaces; petiole 5-30 mm long. Racemes 2-6 cm long; flowers 9-14 mm long; pedicels 3-8 mm long; calyx 4-6.5 mm long, pubescent, the 3 lower teeth usually as long as or longer than tube in mature flowers; petals bright yellow with red or brown markings. Pods narrow-elliptic to oblong, 1-2 cm long, narrowed basally into a slender stipe; foot of aril 1.2-2 mm long. The taxon flowers September to November (VicFlora 2017).

Field observations indicate the taxon is capable of root suckering, which extends the longevity of the mature adult plant and may allow the plant to sucker following intense fire which destroys the fire-sensitive crown.

Generation Length

The generation length of *G. pubescens* is estimated to be 50 to 70 years. This is based on a plausible longevity of 25 to 35 (midpoint 50) years and the expectation that most seed recruitment occurs episodically following rare fire events at plausible pre-settlement fire intervals of 50-70 years or more.

In the absence of fire, the taxon is also likely to recruit opportunistically in response to localised soil disturbance events such as scouring of alluvial terraces by floodwaters, or rock fall at the base of cliffs. Field observations indicate the taxon is capable of root suckering, which extends the longevity of the mature adult plant and may allow the plant to sucker following intense fire which destroys the fire-sensitive crown.

Distribution

The taxon occurs sporadically in south-west and central Victoria, as well as in Tasmania (VicFlora 2017). Records for New South Wales are now attributable to the recently segregated *G. macrocarpa*.

The taxon is reliably recorded in Victoria in four disjunct regions of the state: the Grampians where it is of scattered occurrence in the Halls Gap area, the Fyans Creek valley and adjacent Mt William Range, the northern Victoria Range and an outlier at Mt Dundas; the far South West, where it extends from Gorae and the Cobboboonee Forest to the Stokes River and the South Australian border west of Dartmoor; the eastern Otways between Forrest, Lorne and Apollo Bay; and the Central Highlands from the Hume Plateau east to the Jamieson and Kevington district, and south at least to the Warburton district. Unvouchered records suggest the taxon also occurs in the southern parts of

Wilsons Promontory. Historic collections suggest the taxon once occurred at Diamond Creek (1904) and the Dandenong Ranges (undated), although the 1904 collection may have been taken at Diamond Creek in the headwaters of the Bunyip River, rather than the township of Diamond Creek where currently plotted in the Australasian Virtual Herbarium.

Habitat

The taxon occurs sporadically in dry and wet sclerophyll forest (VicFlora 2017). Site and specimen data suggest that the taxon tends to occupy sheltered sites in river valleys or lower slopes on alluvial or colluvial soils, rarely extending to rocky sites with shallower soils.

Threats

The taxon is likely to have suffered historic decline through habitat loss to agriculture in some districts such as the Narbethong, Buxton, Warburton, Kinglake, Gorae, Mount Richmond and Dartmoor districts. Historic collections from Diamond Creek and the Dandenong Ranges provides circumstantial evidence that the taxon has become locally extinct in these districts.

The key current and future threat to the taxon is targeted browsing by feral deer, with Red and Fallow Deer widespread across the Grampians, Fallow Deer in the Otways and the far South West, Hog Deer at Wilsons Promontory, and Sambar deer throughout the Central Highlands. Sambar are currently undergoing a large increase in population density across the forested regions of the state. Targeted browsing, particularly of recruiting and root-suckering stands, increases the risk of recruitment failure and local extinction. Although the genus *Goodia* is inferred to contain toxic glycosides, the observed targeting of *Indigofera australis* (Austral Indigo) by Sambar and other deer suggests that glycosides, which also occur in the genus *Indigofera*, are readily tolerated by feral deer.

Given its ability to root-sucker, the threat to the taxon from repeat fire events is currently low since the tolerable fire interval (TFI) for the taxon is likely to be around 10 years, at which time fuel loads are unlikely to support a repeat fire within the sheltered habitat range of the taxon. In the longer term, however, the taxon is likely to be at increasing risk of adult and juvenile mortality in response to intense drought stress, and the increasing risk of repeat fire events at intervals approaching the TFI for the taxon.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 248 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

The taxon is estimated to be severely fragmented naturally at the regional and landscape scales, and anthropogenically at the landscape scale in some districts. Geographically isolated occurrences are separated at distances greatly exceeding the dispersal range of the taxon, which has no specialised mechanism for long-distance dispersal. The only plausible dispersal agents are ants (the phenomenon of myrmecochory) which operate at the metre scale only. This precludes the opportunity for recolonisation in the event of local extinction.

It is estimated to have a continuing decline in (iii) above, in response to the impact of the identified threats.

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. Circumstantial evidence of local population size and density include the observation of about 100 plants scattered along 50 metres of roadside along Redmans Track in the Grampians, 5 plants noted at a site on the Halls Gap-Mt Victory Road also in the Grampians, and 5 plants seen at the junction of the Acheron Way and Marysville Road in the Central Highlands.

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. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf

VicFlora (2017). Flora of Victoria, Royal Botanic Gardens Victoria: *Goodia pubescens*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/20e567c9-c730-42b7-8a49-422027405767