Threatened Species Assessment

Hibbertia spathulata subsp. *spathulata*
Rock Guinea-flower

Taxonomy

Hibbertia spathulata subsp. *spathulata* N.A. Wakef.

Current conservation status

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

Proposed conservation status

Vulnerable in Australia

Criteria D1+2

Species Information

Description and Life History

The taxon is a shrub to 1.5 m high, with spreading, tomentose branches. Vestiture of fine, many-branched stellate hairs of about equal size. Leaves sessile, oblanceolate-cuneate, obtriangular to spathulate, 3.2-14.5 mm long, 2.2-7.3 mm wide, tomentose to pubescent but hairs often fewer-branched above; apex truncate or slightly emarginate; ± folded along the midvein above; margins narrow, recurved. Flowers sessile, terminal on all branches, with one leaf-like bract 3-4.2 mm long subtending calyx; sepals 3.5-6.7 mm long, unequal, tomentose; petals obovate to oblanceolate, 6.5-11.8 mm long, bright yellow; stamens 4-9 and a few staminodes arranged around the ovary; filaments free; carpels 2, tomentose to villous. The taxon flowers from September to December (VicFlora 2018).

Generation Length

The generation length of *Hibbertia spathulata* subsp. *spathulata* is estimated to be 35 to 50 years. This is based on an inference from related taxa in comparable habitats. The taxon is likely to be a fire-sensitive, obligate-seed-regenerator, recruiting predominantly episodically post-fire at pre-settlement intervals of 35-75 years with some opportunistic recruitment in response to localised disturbance events and optimal seasonal conditions. The taxon is unlikely to resprout following fire and the longevity is plausibly in the 15-35 (-50) year range. Recruitment is also assumed to occur primarily post-fire from a soil-stored seedbank and, in the absence of fire, from seed released directly from follicles in the canopy of the plant. Seedbank viability is unknown but seed germination of *Hibbertia* in general is fickle and unpredictable.

Distribution

The taxon is rare, occurring in the catchment of the Snowy River between Suggan Buggan and Gelantipy (VicFlora 2018).

In June 2018, Gemma Wright collected a sterile specimen at the edge of a helipad ESE of Black Jack Mountain trig point in the Byadbo Wilderness Area in New South Wales, approximately 20 km from the Victorian border. The specimen is lodged at the Australian National Herbarium in Canberra and was identified as *H. spathulata* by David Albrecht in July 2018. The taxon is therefore no longer considered a Victorian endemic.

Habitat

The taxon is rare, occurring in dry forest or woodland on shallow, stony soils (VicFlora 2018).

Specimen collectors describe the habitat in Victoria as "*Eucalyptus goniocalyx* woodland on rocky (sandstone) slope', '*E. sieberi* open forest with sparse ground layer including *Monotoca scoparia*, *Hibbertia obtusifolia*, *Acacia obtusifolia* on the crest of Museum Spur falling to Snowy River." In NSW, the specimen growing on the edge of a helipad was "growing in a saddle on a NE facing, but flat area, associated with *E. nortonii*, *E. dives* and *Platysace lanceolata*."

Whilst these few collectors' notes support the habitat range cited in VicFlora (2018), a rather divergent habitat description is provided by Elliot and Jones (1990) who state that the taxon "is found in moist places close to streams and among rocks" and that, in cultivation, "plants prefer a protected situation with an abundance of moisture."

Threats

The key threat to the taxon is climatic drying and warming. Together with increasing fire risk, these are projected to increase the frequency of episodic, post-fire recruitment from soil-stored seedbanks. Each such event potentially exposes the recruiting cohort of seedlings and juveniles to recruitment failure due to increasingly frequent and severe drought stress. Targeted browsing by native and exotic herbivores including kangaroos, wallabies, feral horses, goats, rabbits and, increasingly, Sambar Deer (*Rusa unicolor*) is also a threat. The increasing frequency, intensity and duration of extreme drought events also increases the risk of adult mortality, although the resilience of the taxon to this risk is unclear given the divergent interpretations of its habitat range. Collectors' notes and field observations of assessors suggest that the taxon is restricted to exposed habitats with shallow to skeletal soils, in which case the taxon is likely to be resilient under drought stress. If, however, a significant proportion of stands occur in moist places close to streams, as suggested by Elliot and Jones (1990), then at least a proportion of stands are likely to be susceptible to adult mortality and recruitment failure in response to extreme drought events.

The risk of repeat fire events at intervals below the tolerable fire interval for the taxon is low, given the time required for the recorded habitat to accumulate sufficient fuel to carry intense fire.

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

The past population reduction does not meet the threshold for eligibility under Criterion A2. There is insufficient evidence to determine whether will be a future reduction in population size (Criterion A3).

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:

Ineligible under Criterion B

The Extent of Occurrence (EOO) across the taxon's range is estimated to be 614 km² and the Area of Occupancy (AOO) is estimated to be 28 km², but other thresholds under this criterion have not been met.

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

It is estimated that there are 300 to 1,000 mature individuals, but 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 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Vulnerable

The taxon is estimated to have 300 to 1,000 mature individuals. This is based on circumstantial field observations that suggest the taxon is naturally very rare and localised, with individual occurrences comprising small stands of low density.

Eligible under Criterion D2 as Vulnerable

The taxon is estimated to be very restricted. It occurs in a single location, such that this restriction makes the taxon capable of becoming Critically Endangered or Extinct within a time frame of one or two generations. This is in response to the impact of the identified long-term threats, notably climatic warming and drying.

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

Elliot, W.R. and Jones, D.L. (1990). *Encyclopaedia of Australian Plants suitable for cultivation*. Volume 5. Lothian Publishing, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Hibbertia spathulata* subsp. *spathulata.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/4361798c-d8d9-4bae-93a9-5d651b0372d6