Threatened Species Assessment

Hibbertia humifusa subsp. *debilis*
Dergholm Guinea-flower

Taxonomy

Hibbertia humifusa subsp. *debilis* Toelken

Current conservation status

Listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2004).

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

Proposed conservation status

Critically Endangered in Australia

Criterion B1ab(iii)

Species Information

Description and Life History

The taxon is a small, perennial shrub with branches up to 20 cm that grow horizontally and then rise at the tip. Branches bear simple or, rarely, star-shaped hairs below the flowers. Leaves are 4-14 mm long and 1-3 mm wide. Flowers are bright yellow, and borne at the end of a 4-7 mm long, thread-like stalk. Flower bears 1 or 2 bracts at the base or lower third of the stalk. The outer sepals are 3.3-3.6 mm long, 1.3-1.5 mm wide, sparsely covered with star-shaped hairs under scattered simple hairs. The taxon flowers from November to December.

This subspecies is distinguishable from other subspecies of *Hibbertia humifusa* in having outer sepals that are narrower than *H. humifusa* subsp. *humifusa*, and shorter sepals than *H. humifusa* subsp. *erigens*. *H. humifusa* subsp. *erigens* also has scattered star-shaped hairs on its branches while *H. humifusa* subsp. *debilis* does not.

There have been no targeted ecological or biological studies of the taxon. The cues required for germination are unknown, however, anecdotal information suggests fire may be important (Carter *et al*., 2006). Exposing seed to the sun is an effective germination treatment for other *Hibbertia* taxa (TSSC 2016).

Generation Length

The generation length of *Hibbertia humifusa* subsp. *debilis* is inferred to be 25 to 75 years. This is based on the likelihood that the taxon recruits episodically following severe bushfires and uncertainty as to how successfully the taxon can resprout from existing root stocks. It is also based on a plausible pre-settlement fire frequency in the range 25-45 years and a plausible longevity of 15-50 years, depending on whether the taxon can resprout successfully or is an obligate seed regenerator. It should be noted that fire intensity in wet heath habitats is typically intense and can consume not only the crown of perennial plants but also severely damage near-surface root stocks.

Distribution

It should be noted that, of 65 precise site records of this taxon in the Victorian Biodiversity Atlas (VBA), 58 plot within the Brimboal State Forest, five plot into adjacent freehold land and only two plot within Dergholm State Park.

The taxon is endemic to Victoria, where it is narrowly distributed and confined to four populations comprising approximately 200 plants in a small area near the town of Dergholm in south-west Victoria, approximately 350 km west of Melbourne. The plants occur in four known subpopulations, all of which occur within the Dergholm State Park. There is no information on historical distribution and abundance of the taxon, and whether it has declined in abundance or range is unknown (SAC 2004; Carter *et al.* 2006; DSE 2009; TSSC 2016).

Habitat

The taxon grows in wet heathland, co-occurring with *Banksia marginata* (Silver Banksia), *Epacris impressa* (Common Heath), and *Hibbertia fasciculata* (Bundled Guinea-flower). Scattered *Eucalyptus camuldulensis* (River Red-gum) and *E. ovata* (Swamp Gum) comprise a sparse overstorey (Carter *et al*. 2006; TSSC 2016; VicFlora 2018).

Threats

The taxon is potentially threatened by inappropriate fire regimes and, particularly, the increased risk of repeat fire at intervals shorter than the tolerable fire interval for the taxon. There is a potential risk of *Phytophthora cinnamomi* infection leading to loss of vigour or death. The taxon is also threatened by the risk of local site modification by vehicle movement, earth works associated with dam construction and maintenance (one population occurs close to a fire dam and may be at risk from vehicle movement and earthworks associated with dam maintenance), inappropriate fire regimes (fire intervals shorter than the time taken to reach reproductive maturity may threaten population persistence), road and track construction and maintenance, and other activities associated with fire management. The taxon is known to have survived a hot December fire; however, the taxon's regeneration strategy was not recorded. Although not considered to apply to this taxon to the same extent, extrapolating from the documented threats to *H. humifusa* subsp. *erigens,* there is also the threat of weed invasion, European rabbit grazing and associated land degradation. Grazing by rabbits is a complex issue, because light grazing may be beneficial in reducing competition from environmental weeds (TSSC 2016).

While there are no significant threats currently affecting the subpopulations (they are reserved within Dergholm State Park), the small total population size and narrow distribution expose this taxon to risk from stochastic events, while its dependence on wetland habitats exposes it to changes in hydrology (SAC 2004).

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 B1 as Critically Endangered

The Extent of Occurrence (EOO) across the taxon's range is estimated to be 24 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EOO has been made equal to the Area of Occupancy (AOO) to ensure consistency with the definition of AOO as an area within the EOO.

The taxon is estimated to have one location, based on the observation that all key identified threats, notably the increased risk of repeat fire, apply across the range of the taxon and can rapidly affect all individuals of the taxon present.

It has a continuing decline in (iii) above, based on the effects of inappropriate fire regimes, the potential risk of *Phytophthora cinnamomi* infection, local site modification by management activity including vehicle movement, earth works associated with dam construction and maintenance, road and track construction and maintenance, and other activities associated with fire management.

Eligible under Criterion B2 as Endangered

The AOO across the taxon's range is estimated to be 24 km^2, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon has one location, and has a continuing decline in (iii) above.

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 200 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 Endangered

It is estimated that there are 200 mature individuals. The taxon is confined to four populations comprising approximately 200 plants in a small area near Dergholm in the south-west (Carter *et al*. 2006; DSE 2009; TSSC 2016).

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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