Threatened Species Assessment

Banksia saxicola
Rock Banksia

Taxonomy

Banksia saxicola A.S. George

This taxon was formerly considered a form of *Banksia integrifolia*.

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criterion B2ab(iii,v)

Species Information

Description and Life History

The taxon is a spreading shrub or erect tree to c. 13 m high; lignotuber absent; bark smooth to rough, grey; branchlets finally glabrescent. Leaves often whorled, lanceolate to obovate, 4-12 cm long, 1-4 cm wide, discolorous, upper surface dark green, shiny (rusty-pubescent when young), lower surface white-tomentose, midrib hirsute with rusty hairs; margins entire or with a few short teeth (juvenile or subadult leaves), slightly recurved; apex sometimes mucronate; petiole 5-10 mm long. Inflorescence 3.5-8 cm long, 5-6 cm wide at anthesis. Tepals 19-22 mm long, yellow-cream with greyish limb, hairy, deciduous; style curved slightly, yellowish, deciduous. Follicles to c. 60, 12-20 mm long, velvety at first, finally glabrescent except at base; opening spontaneously on ripening or over several years; body of seed more or less lunate, 9-11 mm long, wing 14-19 mm long. The taxon flowers mainly from January to March (VicFlora 2019).

This is a non-lignotuberous species of *Banksia*, suggesting that it is killed by fire and regenerates by seed from an elevated seed bank in serotinous cones. It is obligately slow-growing and takes two decades or more to re-establish a sufficient seed bank in bradysporous cones. There is no soil seed store. It is largely bird pollinated, the oldest and largest specimens providing the bulk of the seed store. The growth is slow after germination, but eventually the taxon becomes the largest plant in the vegetation in the Grampians, or a prominent understorey tree in wet forests on Wilsons Promontory. Mature plants may survive many decades, if unburnt. It is not known if the taxon can establish by seedlings deriving from occasional and scattered seed release without fires in long-unburnt vegetation.

Generation Length

The generation length of *Banksia saxicola* is estimated to be 50 to 80 years. This is based on field observations and consideration of the generation times and times for recovery of elevated seed bank in another Victorian species, *B. spinulosa*.

Distribution

The taxon is restricted to the Grampians and Wilsons Promontory (e.g. Sealers Cove) (VicFlora 2019).

Habitat

The taxon is restricted to free-draining sites on slopes or ridges in non-calcareous soils (derived either from sandstone (Grampians) or granite (Wilsons Promontory). It is subject to occasional fires in both localities, but particularly in the Grampians, its habitat amongst exposed boulders ensures that such fires are patchy and individual plants are missed when surrounding plants are burnt. Soils are siliceous and rainfall is well-distributed throughout the year and relatively high (probably more than 800 mm p.a. In the Grampians, it is a canopy species and, in Wilsons Promontory, it develops into a tall understorey tree in eucalypt forest.

Threats

The most significant threat to the taxon is inappropriate fire regimes, where fires may occur at unsuitable seasons for the taxon's regeneration, and may be too soon after previous fires to permit an adequate elevated seed bank to have developed. Bushfires have become more frequent in recent years. The taxon is also is likely to be susceptible to *Phytophthora cinnamomi* root rot, which is known from both the Grampians and Wilsons Promontory, but the particular localised habitat of the taxon is not conducive to *Phytophthora* infestation. Deer and goat browsing are low-order threats, as both feral herbivores are not well-established in the habitat.

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 Vulnerable

The population reduction over the past 150 to 240 years is suspected to be 10 to 40% (midpoint 25)%, based on (c) above.

Past decline is based on repeat fires. In addition, very little of this taxon's habitat has been cleared.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 100 years is projected to be 20 to 50% (midpoint 35%), based on (c) and (e) above.

Future decline is based on the continuation of a regime of too frequent fires. The effects of climate change are unknown, but higher temperatures and lower winter rainfall are likely to directly affect the taxon, including the resultant increase in extended droughts, lower annual rainfall and likely further increase in fire frequency.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 150 to 240 year period, including both past and future (up to 100 years in the future), is observed to be 25 to 50 (midpoint 35)%, based on (c) and (e) above.

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 220 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The discrepancy between EoO and AoO reflects the two widely separated populations and their tight habitat preferences in each locality.

The taxon is projected to be severely fragmented. The Wilsons Promontory population is very small and threatened by inappropriate fire regimes, such that there is little or no probability of recolonisation should they become extinct.

It is estimated to have 3 locations and has a continuing decline in (iii) and (v) above, based on the current and projected impact of the identified threats, in particular, ongoing inappropriate fire regimes and the likely effects of climate change.

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 suspected that there are 15,000 to 70,000 (midpoint 40,000) mature individuals, which exceeds the thresholds for criterion C.

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 inferred 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

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VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Banksia saxicola*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/622dc84f-ce0a-4f95-bcd7-fdf8f0994164