

Threatened Species Assessment

Astelia australiana Tall Astelia

Taxonomy

Astelia australiana (J.H. Willis) L.B. Moore

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 1991)

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

Proposed conservation status

Endangered in Australia

Criteria A2ace+3ce+4ace; B1ab(i,ii,iii,iv,v)+2ab (i,ii,iii,iv,v)

Species Information

Description and Life History

The taxon is a robust, tufted plants to c. 1.8 m high, with a long, stout, branching rhizome. Leaves linear, 60-230 cm long, 5-10 cm wide, with a close, silvery and silky indumentum on the lower surface. Inflorescence a racemose panicle to 1.2 m high, many-flowered; axis rather stout; each of the 5-10 racemes 10-20 cm long, each subtended by a leaf-like bract. Flowers 12-18 mm wide, green to deep maroon, at least the males with a strong foetid odour; segments fused basally, reflexed at tips. Male or bisexual flowers with stamens shorter than the perianth. Female flowers with rudimentary stamens, sometimes producing fruit without fertilization; perianth tube fleshy, ovary c. 4-6 mm long, 3-locular. Berry ovoid to globular, 6-10 mm long, orange. Seeds 4-12, c. 2.5 mm long. The taxon flowers from Nov.-Feb. (VicFlora 2018).

Most reproduction is by rhizomes, but isolated plants upslope of the larger colonies in the drainage lines suggest that the taxon is not obligately restricted to swampy drainage lines. Flowering is rare and seed set is very rare, and has not been recorded in the Otways population. The genetic distinctions between relatively geographically close populations in the Beenak-Upper Yarra area also suggest that sexual reproduction is rare but not unknown. Vegetative growth is perennial and long-lasting.

Generation Length

The generation length of *Astelia australiana* is estimated to be 15 to 80 (midpoint 30) years. The taxon is strongly rhizomatous and sexual reproduction is rare, sporadic and unpredictable. Since European settlement, the Otways population has never been observed to set seed.

Distribution

The taxon is a Victorian endemic, restricted to the Beenak-Upper Yarra region in south-central Victoria and a discrete single population in the Otways Ranges in south-western Victoria. It is known from 4 catchments: La Trobe, Bunyip and Yarra Rivers in the Central Highlands, and Aire River in the Otways.

Habitat

Nearly all populations are within or surrounded by Cool Temperate Rainforest (*Nothofagus-Atherosperma-Acacia melanoxylon* dominant) and often in swampy drainage lines, but they occasionally occur as isolated plants on protected valley slopes. The sites are always cool, permanently moist and sheltered by tall trees from strong, desiccating winds and fires, in landscapes with high mean annual rainfall, which may fall at any time throughout the year. Soils are loamy, gradational, well-structured and relatively fertile, although they are swampy for much of the year.

Threats

The taxon is threatened by inappropriate fire regimes, climate change, Sambar Deer (*Rusa unicolor*), disease (Myrtle Wilt, Pythium), weed establishment and mechanical disturbance during road management, bushfire suppression and forestry operations (Cutler & Murphy 2010, DSE (2003)). Bushfires have burnt stands in the past and are the cited explanation for local extinctions. The most recent catastrophic fires were the Black Saturday fires of 2009. Currently, fuel management operations are not usually applied in these wet forests, but isolated upslope plants are affected by occasional fuel management operations. However, in the future, fuel management operations may become more intensive. Regrowth forests in the catchments of affected drainage lines also desiccate these same drainage lines as they evaporate more water than do mature forests.

Sambar deer are common and numbers are increasing in these areas, causing visible damage. Many Tall Astelia sites are in swampy drainage lines - the preferred wallow sites for Sambar deer. In addition, Sambar deer browse the foliage and trample these boggy soils.

Altered hydrology is a substantial threat in catchments dominated by regrowth forests. Regrowing forests absorb and evaporate to the atmosphere at much higher quantities of soil water than mature forests, leaving less water to maintain the swampy conditions of the drainage lines that Tall Astelia favours (Vertessy et al. 2001).

Myrtle Wilt may threaten some Tall Astelia populations by killing the sheltering *Nothofagus* trees, thus opening the sites to fires and desiccation. There is a suspicion that Pythium may be the explanation for a lack of recruitment in many stands.

Spatial analysis of likely habitat for Tall Astelia on all land tenures indicates that 52% occurs within the CAR reserve system, including parks and reserves, special protection zones and areas excluded from harvesting by prescription under the Victorian Code of Practice for Timber Production 2014 (the Code). Species-specific protections for Tall Astelia are included in the Code. Other more general prescriptions such as protection and buffering of rainforest and waterways also provide protection from timber harvesting.

In recent years, modified harvesting and forest regeneration practices have been implemented in native forest to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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 45 to 240 years is estimated to be in the range of 50 to 75%, based on (a), (c) and (e) above.

Past decline is based on former records and previous management practices.

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 45 to 100 years is projected to be in the range of 50 to 75%, based on (c) and (e) above.

Future decline is based on the likely impacts of climate change, particularly drought and bushfires. There may be additional impacts from forestry operations in some areas in the short-term.

Eligible under Criterion A4 as Endangered

The population reduction over any 45 to 240 year period, including both past and future (up to 100 years in the future), is inferred to be in the range of 50 to 75%, based on (a), (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 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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 and B2 as Endangered

The Extent of Occurrence (EoO) is estimated to be 1,587 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 76 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

The taxon is estimated to be severely fragmented. There are multiple, small isolated subpopulations that are all at risk from the identified threats, such that there is increased extinction risk and little or no probability of recolonisation should subpopulations become extinct.

The taxon is considered to occur in one location as all key identified threats apply across its range and can rapidly affect all individuals of the taxon present.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on hydrology changes and fires.

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 100 to 10,000 (midpoint 2,000) mature individuals, but this qualifier is too weak and other thresholds under this criterion have not been met.

Criterion D. Very small or restricted populations			
	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 km ² 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

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