Threatened Species Assessment

Acacia sporadica
Pale Hickory-wattle

Taxonomy

Acacia sporadica N.G. Walsh

This taxon was previously included in *A. penninervis*, from which it can be distinguished by its shorter, often root-suckering growth-habit, shorter, relatively broader, glaucous phyllodes with glands not connected to the midrib by a prominent vein, bright yellow flowers that are produced in later winter/early spring (*A. penninervis* has cream or white flowers produced in summer), and smaller, transverse seeds.

Current conservation status

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

Proposed conservation status

Critically Endangered in Australia

Criteria B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(ii)

Species Information

Description and Life History

The taxon is a shrub to c. 3 m high, largely reproducing by root suckers; branchlets glabrous. Phyllodes obovate to elliptic, 2.5-6.5 cm long, 8-32 mm wide, usually slightly asymmetric, glaucous, obtuse, sometimes with a short point; faintly to moderately prominently pinnately veined, midrib and marginal veins very prominent; gland 2-20 mm above pulvinus, margin often shallowly indented at gland which is not obviously connected to midrib by a lateral vein. Racemes sometimes in panicles; rachis 1.5-7 cm long, glabrous; peduncles 3-6 mm long, glabrous; heads globular, 15-25-flowered, bright lemon-yellow. Flowers 5-merous; sepals united. Pods to 9 cm long, 10-15 mm wide, thinly coriaceous; seeds transverse, oblong to elliptic, 4-5 mm long, slightly shiny, black, funicle pale brown, aril clavate. The taxon flowers from July to September (VicFlora 2016).

Generation Length

The generation length of *Acacia sporadica* is estimated to be 100 to 200 years, or even 1,000 years. This is based in the clonal nature of the taxon, reproducing mainly by root suckers. Individual clones vary from 3-9 m diameter with up to 200 stems or ramets per clone at the Howqua site and up to 50 stems or ramets per clone arising from an extensive rhizome system at the Carboor Upper site (Walsh 2004). The longevity of each clone is indefinite, and, in the effective absence of a seedbank, the rate of generational turnover may be at the century or millennial scale.

Distribution

The taxon is endemic to Victoria where it is known from 3 disjunct locations (Taradale, Howqua and Carboor) (VicFlora 2016). The largest stand is located at Carboor Upper which is 38 km south-west of Wangaratta and 180 km north-east of Melbourne. The smaller surviving stand is located on both sides of Symes Track in State forest south of the Howqua River and 8 km ESE of the Howqua River bridge on the Mansfield-Jamieson Road.

The most disjunct occurrence was on Ridge Road, 200 m east from Old Tower Road, 5 km west from the Calder Highway at Taradale, in the Fryers Ranges State Forest, south-east of Castlemaine. This occurrence was reported by the late Ern Perkins (pers. comm. to David Cameron) to have been destroyed by fire management activity.

Habitat

At each of the three sites *A. sporadica* occurs in grassy, dry eucalypt woodland or open forest, with *Eucalyptus goniocalyx* dominant or co-dominant (with *E. macrorhyncha* at both Taradale and Carboor, and *E. dives* at Howqua). At each site soils are shallow, derived from Ordovician (Fryers Ridge) or Silurian (Carboor, Howqua) sedimentary parent material. The tussock grass *Rytidosperma pallidum* is abundant at all three sites. Altitudes vary from c. 350 to 750 m (Walsh 2004; VicFlora 2016).

The Carboor Upper stand occurs in Box-Stringybark forest in hill country on Ordovician sediments, at approximately 350-450 m altitude and with annual rainfall of 800-1200 mm. The stand is located on the edge of a pine plantation with a few plants extending into the plantation, suggesting it has probably been reduced by pine plantings.

The habitat of the Taradale stand is *Eucalyptus goniocalyx - E. macrorhyncha* open forest with *Brachyloma daphnoides, Grevillea alpina, Pultenaea humilis, Acrotriche serrulata, Leucopogon virgatus, Platylobium formosum, Joycea pallida, Poa sieberiana* and *Lomandra filiformis* on shallow soil overlying a shaly sedimentary substrate.

Threats

The taxon is threatened by its highly compromised ability to recruit from seed, since there is a low level of seed production in the largest type subpopulation at Carboor Upper, and all clones in the highly disjunct Howqua subpopulation are functionally sterile. The disjunct subpopulation near Taradale in the Fryers Range State Forest also failed to set seed (Walsh 2004). This renders the taxon uniquely susceptible to local extinction since any threat to the established adult clones cannot be compensated by recruitment from a soil-stored seedbank.

The greatest long-term threat to established clones is the combined impact of repeat fire events coupled with extreme drought stress, resulting in vegetative recruitment failure as well as seedling recruitment failure should there be a viable seedbank present. The Howqua stand is also threatened by small population size, since it comprises 9 clones over an area of only 250 m x 50 m (Walsh 2004) rendering this occurrence highly susceptible to localised stochastic events.

The Taradale subpopulation comprised only three depauperate ramets in 2002, two of which were mature and only c. 15 cm apart, the third a non-flowering ramet c. 25 cm high and c. 5 m from the others. It is not known whether these ramets were separate individuals or were connected by rhizomes. There had been no confirmed seed set on plants in the Taradale subpopulation since its discovery in 1976. There have been unsuccessful searches for more plants in similar habitat in the area around Taradale (Walsh 2004). All three ramets were subsequently destroyed by fire management activity along Ridge Road (Ern Perkins pers. comm. to David Cameron). In the absence of a seedbank this disjunct occurrence is presumed extinct.

All three occurrences are unreserved, which exposes them to a potential range of activities associated with production forests. The Carboor Upper stand is adjacent to a pine plantation and the taxon is threatened in this district by plantation management activity, although plantations are subject to protection under the Code and native vegetation is generally protected. Some plants at the Howqua site were destroyed through roadworks during 2002 (Walsh 2004).

Spatial analysis of likely habitat on all land tenures for *A. sporadica* indicates that 45% 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). There are no species-specific protections for *A. sporadica* in the Code, however other more general prescriptions provide protection from timber harvesting.

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 300 to 6000 years is inferred to be 30 to 80% (midpoint 50%), based on (a) and (c) above.

Eligible under Criterion A4 as Endangered

The population reduction over any 300 to 600 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 80 (midpoint 50) %, based on (a) and (c) above.

The magnitude of future decline cannot be estimated with any confidence since the identified threats operate stochastically and with unpredictable intensity.

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 8 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 EoO.

The taxon is severely fragmented naturally at the regional scale and may also be severely fragmented anthropogenically at the landscape scale. The two known surviving occurrences are highly disjunct, and the taxon is effectively sterile with a low level of seed production throughout the Carboor Upper stand and all are clones functionally sterile in the Howqua stand. Therefore, there is no capacity for long-distance dispersal or recolonisation.

It is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on the effects of repeat fire events, extreme drought stress, localised stochastic events, fire management activity and plantation management activities.

Eligible under Criterion B2 as Critically Endangered

The AoO across the taxon's range is estimated to be 8 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is estimated to be severely fragmented, to have 1 location, and has a continuing decline in (i), (ii), (iii), (iv) and (v) 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:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 60 to 150 mature individuals. Population size is based on the observation that the Carboor Upper stand comprises an estimated 3000 stems or ramets arising from an extensive rhizome system with up to 50 stems per clone or genet. The Howqua stand comprises 9 clones or genets, each comprising up to 200 stems or ramets (Walsh 2004). The Taradale stand, comprising a single clone of three stems, is reported to have been destroyed.

The number of mature individuals is estimated to continue to decline, and the percentage of mature individuals in one subpopulation is 90-100 %.

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 60 to 150 mature individuals.

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 (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Acacia sporadica*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/42545f9a-e069-4254-9908-970b7ff44a9a

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