

Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the shrub, *Dodonaea stenophylla* F. Muell. as a VULNERABLE SPECIES in Part 3 of Schedule 1 of the Act and, as a consequence, to omit reference to *Dodonaea stenophylla* F. Muell. from Part 1 of Schedule 3 (Extinct Species) of the Act. Listing of Vulnerable species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Dodonaea stenophylla is currently listed as an extinct species in New South Wales (NSW) under the Act. However, it was rediscovered in 1994 and recent survey work has detailed the extent of populations in the area around Bingara on the NSW north western slopes (Hunter 2019). Consequently, *D. stenophylla* is to be removed from Part 1 of Schedule 3 (Extinct Species) of the Act.

Dodonaea stenophylla is a common and widespread shrub throughout Queensland and parts of the Northern Territory. It is not considered likely to be nationally threatened as it is unlikely to meet any IUCN criteria for national listing (Neldner *in litt.* November 2019). There is no evidence of significant decline across its range in Queensland (which has most of the recorded occurrences), and population numbers in this state are likely to be very large. Though not currently considered to be nationally threatened, *Dodonaea stenophylla* has been assessed in NSW at the state scale, as per the BC Act Part 4 Division 2 (4.4).

Dodonaea stenophylla was found to be eligible for listing as Vulnerable in New South Wales (NSW) under Clause 4.3 (c) (d) (e i, iii) of the Biodiversity Conservation Regulation 2017. The main reasons for this species being eligible are: i) it has a highly restricted geographic range in NSW; ii) there is inferred decline in the quality of the habitat and the number of mature individuals due to browsing and damage by feral animals, possibly in combination with drought; and iii) it is known to exist at no more than 10 locations in NSW.

The NSW Threatened Species Scientific Committee has found that:

1. *Dodonaea stenophylla* was described by PlantNet (accessed January 2020) as an "Erect shrub to 4 m high. Leaves simple, erect, linear, 3–11 cm long, 1–2.5 mm wide, apex acute, base attenuate, margins revolute, glabrous; sessile or tapering to a petiole 5–7 mm long. Flowers usually in axillary few-flowered cymes; pedicels 2–15 mm long. Sepals 4, lanceolate or acute, 1.2–1.5 mm long, not persistent. Stamens 8. Ovary glabrous or rarely pubescent near apex. Capsule 4-, rarely 3-winged, 5–11 mm long, 11–15 mm wide, glabrous; wings 3.5–8 mm wide, membranous."

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2. In NSW, *Dodonaea stenophylla* was originally known from the Bingara area on the north western slopes from collections by Leichhardt in 1843 and Boorman in 1907. Hunter (2019) recorded it in 1994 to the east of Bingara and in 2001 from the Molroy section of Bingara State Conservation Area (SCA). It has been recorded in six areas of NSW, three confirmed by herbarium records and three unconfirmed sightings. *Dodonaea stenophylla* is reserved in Bingara SCA and Gwydir River National Park (NP). Both reserves were formerly State Forests managed for cypress (*Callitris glaucophylla*) logging and grazing prior to their gazettal in 2005 (NSW NPWS 2017). The land surrounding the reserves is largely cleared and currently consists of grazing and cropping properties (NSW NPWS 2017).
3. *Dodonaea stenophylla* has a highly restricted geographic distribution in NSW. The extent of occurrence (EOO) was estimated to be 799 km² based on a minimum convex polygon enclosing all reliably mapped occurrences of the species in NSW, the method of assessment recommended by IUCN (2019). The area of occupancy (AOO) for *D. stenophylla* in NSW was estimated to be 52 km², based on 2 km x 2 km grid cells, the spatial scale of assessment recommended for assessing AOO by IUCN (2019).
4. *Dodonaea stenophylla* generally occurs in shrubby woodlands on sandy loamy soils (PlantNet May 2020). In the Gwydir River NP, *D. stenophylla* mostly occurs on often very steep mid to upper slopes, and sometimes on crests. The vegetation is open woodland which at times verges on Semi-evergreen Vine Thicket on stony metasedimentary soils (Hunter 2019). The dominant co-occurring species are *Callitris glaucophylla*, *Brunonia australis*, *Cymbopogon refractus*, *Oxytes brachypoda*, *Aristida personata*, *Austrostipa scabra*, *Eucalyptus melanophloia*, *Opuntia aurantiaca* and *Scleria mackaviensis* (Hunter 2019). In the Bingara SCA (Molroy Section), *D. stenophylla* occurs in *Eucalyptus melanophloia* open woodland with or without co-occurring dominants of *Callitrus glaucophylla* or *Brachychiton populneus*. Other co-occurring species include *Olearia gravis*, *O. elliptica*, *Breynia cernua*, *Dodonaea viscosa*, *Carissa spinarum*, *Psydrax odorata*, *Acacia deanei*, and *Pomaderris* sp. (NSW NPWS 2017). *Dodonaea stenophylla* was observed resprouting from ground level buds and stems as a response to browsing and damage from feral animals (Hunter 2019).
5. The fire response of *D. stenophylla* is poorly known (P. Croft *in litt.* Feb 2019) though it is thought to be an obligate seeder (Fensham *et al.* 2003). Low numbers of individuals appeared to have germinated in the Gwydir River NP within recent seasons (Hunter 2019), indicating germination may not depend on a disturbance event such as fire. The fire history for the two reserves is unknown but both are thought to be long unburnt (P. Croft *in litt.* April 2019). No known populations of *D. stenophylla* were burnt in the recent fires of the 2019/2020 fire season (DPIE mapping accessed May 2020).
6. There are estimated to be in the order of 100,000 *Dodonaea stenophylla* individuals in the Bingara area including Gwydir River NP (c. 90,000 individuals) and Bingara SCA (c. 10,000 individuals) (Hunter 2019). There are no data on the abundance of the species in other populations.

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7. The main threat to *Dodonaea stenophylla* in NSW is browsing and damage by feral goats (*Capra hircus* Linnaeus 1758) and feral deer (family Cervidae). In Gwydir River NP, Hunter (2019) estimated 80% of *D. stenophylla* individuals showed evidence of browsing and damage from goats including broken and twisted stems, thinner stems and trunks eaten almost to ground level, and uprooted individuals. Deer were seen on most survey days and many ring-barked *D. stenophylla* plants were observed (Hunter 2019). Seed production was mostly limited to individuals that had grown to a height that was above the browsing line of goats and deer. The combined effects of browsing and drought may be affecting the ability of the damaged *D. stenophylla* individuals to recover (Hunter 2019). The reduced reproductive ability of the population may lead to decline. Goats are also present in Bingara SCA (OEH 2020) and throughout this area of NSW. The extent of damage from feral goats and deer has not been quantified at the other populations. 'Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758' and 'Herbivory and environmental degradation caused by feral deer' are listed as Key Threatening Processes under the BC Act.
8. *Dodonaea stenophylla* F. Muell. is not eligible to be listed as an Endangered or Critically Endangered species.
9. *Dodonaea stenophylla* F. Muell. is eligible to be listed as a Vulnerable species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a high risk of extinction in New South Wales (as per Part 4 of the BC Act) in the medium-term future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Appendix 1

Assessment against Biodiversity Conservation Act criteria

The Clauses used for assessment are listed below for reference.

Clause 4.2 – Reduction in population size of species

(Equivalent to IUCN criterion A)

Assessment Outcome: Data Deficient.

(1) - The species has undergone or is likely to undergo within-a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	

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	(d)	the actual or potential levels of exploitation of the species,
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

Clause 4.3 – Restricted geographic distribution of species and other conditions (Equivalent to IUCN criterion B)

Assessment Outcome: Vulnerable under Clause 4.3 (c*) (d) (e i, iii).

* Although *Dodonaea stenophylla* meets the thresholds for restricted geographic distribution (EOO and AOO) for Endangered, the species only meets the Vulnerable threshold of Clause 4.3(d). Hence the overall assessment under Clause 4.3 is Vulnerable.

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	* (b)	for endangered species	highly restricted, or
	* (c)	for vulnerable species	moderately restricted.
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,
		(iv)	the number of locations in which the species occurs or of populations of the species.
	(f)	extreme fluctuations occur in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 – Low numbers of mature individuals of species and other conditions

(Equivalent to IUCN criterion Clause C)

Assessment Outcome: Not met.

The estimated total number of mature individuals of the species is:				
	(a)	for critically endangered species	very low, or	
	(b)	for endangered species	low, or	
	(c)	for vulnerable species	moderately low.	
and either of the following 2 conditions apply:				
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):		
		(i)	for critically endangered species	very large, or
		(ii)	for endangered species	large, or
		(iii)	for vulnerable species	moderate,

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	(e)	both of the following apply:		
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and	
		(ii)	at least one of the following applies:	
			(A)	the number of individuals in each population of the species is:
			(I)	for critically endangered species extremely low, or
			(II)	for endangered species very low, or
			(III)	for vulnerable species low,
			(B)	all or nearly all mature individuals of the species occur within one population,
			(C)	extreme fluctuations occur in an index of abundance appropriate to the species.

Clause 4.5 – Low total numbers of mature individuals of species (Equivalent to IUCN criterion D)

Assessment Outcome: Not met.

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 – Quantitative analysis of extinction probability (Equivalent to IUCN criterion E)

Assessment Outcome: Data Deficient.

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 – Very highly restricted geographic distribution of species–vulnerable species (Equivalent to IUCN criterion D2)

Assessment Outcome: Not met.

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.
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 NSW Threatened Species Scientific Committee

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Supporting Documentation:

Scott J (2020) Conservation Assessment of *Dodonaea stenophylla* F. Muell. (family Sapindaceae). NSW Threatened Species Scientific Committee.

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