Threatened Species Assessment

Duma horrida subsp. *horrida*
Spiny Lignum

Taxonomy

Duma horrida subsp. *horrida* (H. Gross) T.M. Schust.

Current conservation status

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A3ce+4bce

Species Information

Description and Life History

Stiff, divaricately branched, but rather open shrub to c. 1 m high and wide (but usually much less), stems greyish-brown, commonly partly leafless, often spine-tipped. Leaves produced in tufts on short lateral shoots, sessile, linear, 1–5 cm long, 1–2 mm wide, thickish, margins recurved to revolute, the midvein often apparently impressed on the lower surface. Flowers sessile in axillary or nodal clusters; perianth segments 2–3 mm long, fused in lower c. one-third in males, in lower half to two-thirds in females, cream or yellowish, sometimes reddish-tinged, female flowers becoming more or less turbinate in fruit, with segments prominently thickened about the middle. Nut broadly ovoid, 2–2.5 mm long, obscurely trigonous, smooth, brown. Flowers mainly September-November (VicFlora 2018).

Spiny Lignum is a very long-lived subshrub. It usually regenerates after flooding, and is likely to have an obligate requirement for saturated soils for successful establishment. Once established it is extraordinarily drought tolerant, and will bloom and set seed in most years. It has little capacity for rhizomatous spread but has a very long-lived and hardy woody rootstock.

Generation Length

The generation length of *Duma horrida* subsp. *horrida* is suspected to be 100 to 150 years. The taxon can still be found at Pine Plains (Wirrengren Plain) at the end of the Outlet Creek system. It is believed to be dependent on flooding, or at least saturated soils, for successful germination and establishment. Flooding has not occurred at the Pine Plains sites since 1922, which shows that the plant is able to survive for this extended period, but not regenerate, implying very long generation times.

Distribution

Spiny Lignum is restricted to ephemeral lake beds and similar seasonal wetlands, associated with inland flowing rivers in south-eastern Australia. While it is part of the Murray-Darling system in other states, in Victoria it is also found in other inland-flowing stream systems.

Habitat

The taxon's habitat is fine-grained alluvial or paludal fertile loams associated with weakly saline sites along inland-flowing river systems. It can tolerate being flooded well, but probably for no more than two years, and is thus restricted to the upper flood reaches of permanent river systems such as the Murray River. It can be locally common on terminal lake beds of endorheic systems, such as Lake Buloke, and Wirrengren Plain.

Threats

Spiny Lignum is clearly palatable to browsers, notably goats, rabbits, kangaroos, and stock, and the above-ground foliage is often completely removed under drought conditions. Nevertheless, the woody rootstock is so strong that it can persist in sites where these threats operate, although it will be weakened and gradually disappear without the amelioration of these threats. There is a longer term threat in the removal of peak floods, and in some sites removal of all floods, due to water diversion for agriculture, in almost all sites from which it has been recorded.

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 last 300 to 450 years is estimated to be 30 to 90% (midpoint 50%), based on (b), (c) and (e) above.

The taxon has suffered severe declines since European settlement, as a result of land alienation, water diversion, and the effects of native and introduced herbivores.

The causes of reduction may not have ceased, be understood or be reversible.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 100 years is suspected to be 30 to 100% (midpoint 90%), based on (c) and (e) above.

The taxon's habitat quality is definitely degraded, such that new establishment is largely impossible in most sites. Browsing by goats and rabbits persists, although there have been patchily successful attempts at reduction of this

pressure within the large national parks. Changes to flooding regimes and a drying climate are also likely to drive declines.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 300 to 450 year period, including both past and future (up to 100 years in the future), is inferred to be 60 to 100% (midpoint 90%), based on (b), (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 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 B as Endangered

The Area of Occupancy (AoO) is estimated to be 459 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is suspected to be severely fragmented, 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:

Ineligible under Criterion C

It is suspected that there are 1,000 to 30,000 (midpoint 10,000) mature individuals, but the qualifier is too weak, and 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:

Ineligible under Criterion D

It is suspected that there are 1,000 to 30,000 (midpoint 10,000) mature individuals, which exceeds the thresholds for criterion D.

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

References

ALA online (no date). Atlas of Living Australia: *Duma horrida* subsp. *horrida*. Retrieved from: https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2886882

DEPI (2014). *Advisory list of rare or threatened plants in Victoria - 2014.* Department of Environment and Primary Industries, Melbourne.

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Duma horrida* subsp. *horrida.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/f10cae27-42fd-4e97-93d2-0b03c2b68fdf