Threatened Species Assessment

Callistemon subulatus
Dwarf Bottlebrush

Taxonomy

Callistemon subulatus Cheel

Callistemon genofluvialis, *C. forresterae*, *C. kenmorrisonii,* and *C. nyallingensis* are all quite localised in East Gippsland, and are somewhat intermediate between the relatively common and widespread *C. citrinus* and *C. subulatus*. These localised taxa were regarded by Craven as hybrid swarms, presumably involving *C. citrinus* and *C. subulatus* (VicFlora 2016).

Current conservation status

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

Proposed conservation status

Endangered in Victoria

Criteria B1ab(iii,v)+2ab(iii,v); C1

Species Information

Description and Life History

The taxon is a low, spreading shrub mostly to 1 m high; bark hard, dark, fissured; branches generally flexuous. Leaves densely arranged, linear to subulate or rarely terete, 2-4 cm long, 2-3 mm wide, shortly mucronate. Flower spikes 4-8 cm long, 4.0-4.5 cm wide generally with some leafy bracts; axis sparsely hairy or glabrous; hypanthium with or without hairs; stamens 15-20 mm long, filaments dark crimson, anthers dark purplish-red. Capsules 4-5 mm long and wide. The taxon flowers mainly in the Summer (VicFlora 2016).

The taxon is a rheophytic chasmophyte, a habitat specialist highly dependent on the hydrological stability of its rocky riparian habitat for successful recruitment and the survival of adult plants.

Generation Length

The generation length of *Callistemon subulatus* is estimated to be 45 to 90 years. This is based on the inferred longevity of the taxon and the assumption that recruitment occurs opportunistically and independently of fire, although fire may stimulate an additional recruitment pulse on rare occasions. It is unclear whether the taxon is capable of root suckering, but it is likely to resprout from the tenacious rootstock following flood damage or, potentially, low to moderate intensity fire events.

Distribution

In Victoria, the taxon is restricted to far East Gippsland, mostly from the Tambo River eastwards, but with an isolated westerly occurrence near Briagolong (VicFlora 2016). Specifically, the taxon is reliably recorded in Victoria from Tonghi Falls on Tonghi Creek, west of Cann River, eastward to the NSW border, and from the coast at Wingan Inlet inland to Beehive Creek Falls in the Upper Cann Valley. The taxon is also found in NSW.

Inspection of all specimens at MEL and NSW indicates that there are no reliable collection records for the Snowy River Gorge, Nowa Nowa, or Briagolong districts. Fine-leaved rheophytic forms of *Callistemon pallidus* and *C. sieberi* are abundant in the Briagolong district, and are easily confused with *C. subulatus* when not in flower. Such

populations are likely to account for records in the Briagolong and Snowy River districts. Similar specimens in the Boggy Creek Gorge near Nowa Nowa are now referable to the recently described *Callistemon nyallingensis*.

Habitat

The taxon occurs mostly among rocks in watercourses (VicFlora 2016).

Threats

The taxon is threatened by climatic drying and warming, which are projected to result in reduced stream flow. This affects all rheophytic chasmophytes, which require adequate stream flow reliability for seed recruitment, lodging of branches, capsules and seed in suitably moist sand in rock crevices and stream beds; and the survival of adult plants. Reduced stream flow is predicted to result in a greater concentration of surviving adults around larger, more permanent water holes, resulting in less continuous, more locally fragmented subpopulations. The impact of these threats is likely to be exacerbated by inappropriate fire regimes which increase the flammability and water uptake of regenerating forest vegetation. This further reduces stream flow and increases the risk of extreme drought stress, adult mortality, recruitment failure, and seedbank depletion, exhaustion and local extinction.

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 A3 as Vulnerable

The population reduction over the next 100 years is projected to be 30 to 50% (midpoint 40%), based on (c) above.

Future decline is based on the projected impacts of the identified threats.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 135 to 270 year period, including both past and future (up to 100 years in the future), is estimated to be 30 to 55% (midpoint 40%), based on (c) above.

There is no evidence to suggest that the taxon has experienced any significant historic decline. It should be noted that almost all known occurrences are on public land, many of which are now protected in parks and reserves. Future decline is based on the projected impacts of the identified threats.

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			

a

Evidence:

Eligible under Criterion B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 1,799 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented, and is estimated to have 1 location. It has a continuing decline in (iii) and (v) above, based on the current and projected impact of the identified threats, including climatic drying and warming, reduced stream flow, inappropriate fire regimes and extreme drought stress.

The taxon is severely fragmented naturally at the landscape scale. The taxon is restricted to drainage line habitats in numerous isolated catchment systems with short range dispersal, potentially facilitated by downstream water movements within each sub-catchment only. This precludes the possibility of recolonisation in the event of local extinction.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 119 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, the taxon is severely fragmented, has 1 location and has a continuing decline in (iii) 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 C1 as Endangered

It is estimated that there are 1,000 to 5,000 mature individuals. This is based on extensive field observations.

There is estimated to be a continuing decline of 25 to 50% (midpoint 40%) within two generations.

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 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

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

VicFlora (2016). Flora of Victoria, Royal Botanic Gardens Victoria: *Callistemon subulatus*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/a361ed90-f6cd-4b55-85fc-ba7c55270581