Threatened Species Assessment

Crinum flaccidum
Darling Lily

Taxonomy

Crinum flaccidum Herb.

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2004).

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

Proposed conservation status

Endangered in Victoria

Criteria A3c; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

Species Information

Description and Life History

Crinum flaccidum plants are very long-lived evergreen or seasonally dormant perennials with a large bulb and roots, the bulb-plate (abbreviated stem), roots and leaves are renewed periodically. There is continual turnover of all tissues: in the bulb-plate, bearing the roots, leaves and inflorescence, the distal part progressively dies and is renewed proximally. The roots are contractile and pull the bulb to a depth of 15cm or more into the soil. Clarke and Parsons (1994) recorded 60 cm and another record was of 120 cm! Plants flower in the summer in response to a substantial rain event, or, according to location, floods on river systems; there is typically mass flowering in the population. Plants are self-fertile and are pollinated nocturnally by hawk moths attracted to the large nocturnally very fragrant flowers (nectar reward). The large fleshy seeds are passively shed and separate from the infructescence when it collapses; dispersal is typically short-distance with large often very localised populations developing. Seeds are buoyant (for at least two months) and can be dispersed on flood waters. Seeds have a short longevity (only a few months) and there is no carry-over to form a seedbank. The seeds germinate precociously on the surface of the soil. All parts of the plants are toxic (in a family notably loaded with alkaloids) and also contain calcium oxalate crystals.

Generation Length

The generation length of *Crinum flaccidum* is suspected to be 50 to 100 years. This is based on the indefinite longevity of plants and the continuous recruitment mode.

Distribution

The taxon is confined to the Hattah-Kulkyne area and the Murray Scroll Belt (bioregion).

Habitat

Crinum flaccidum occurs on a range of soil types from the deep silty sands of dune slopes, sandy alluvium in riverine systems to very stiff, seasonally waterlogged clay soils. Plants typically occur in full sun.

Threats

Threats to *Crinum flaccidum* include climate change (decreased rainfall, increased evaporation, extreme temperatures), off-road vehicles, predation of bulbs by pigs (Lindsay island) and weed invasion. Reproductivity (flowering and fruiting) and recruitment likely to be reduced by declining rainfall; the taxon requires good summer rainfall to flower.

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 Endangered

The population reduction over the next 100 years is projected to be 50 to 60%, based on (c) above.

Crinum flaccidum is projected to decline due to climate change (decreasing rainfall, increased evaporation, extreme temperatures) as well as predation by pigs.

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 Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 3,001 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

The taxon is estimated to be severely fragmented. subpopulations go extinct there seems little chance that they could recover/recolonise via seed dispersal which only occurs via floods (rarely) or very short distance dispersal of the very large seeds.

It is estimated to have 1 location. It has a continuing decline in (i), (ii), (iii), (iv) and (v) above based on the current and projected impact of the identified threats.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 89 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, is estimated 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:

Ineligible under Criterion C

No reliable estimate of the total population size for the taxon is available.

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

There is insufficient evidence to determine the number of mature individuals.

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

References

Clarke J., Parsons R.F. (1994). Ecology of *Calostemma* and *Crinum* (Amaryllidaceae) in the River Murray area, south-eastern Australia. *Proceedings of the Royal Society of Victoria* 106, 129-145.

Cunningham G.M., Mulham W.E., Milthorpe P.L., Leigh J.H. (1992). *Plants of Western New South Wales*. (CSIRO publishing: Collingwood).

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

PlantNET (2021). New South Wales Flora online. Retrieved from: http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Crinum~flaccidum

SAC (2004). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 694 *Crinum flaccidum*.

VicFlora (2019). Flora of Victoria, Royal Botanic Gardens Victoria: *Crinum flaccidum.* Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/b6cbc146-57b9-4050-b3a3-d98f12d2779f