Threatened Species Assessment

Pseudophryne semimarmorata
Southern Toadlet

Taxonomy

Pseudophryne semimarmorata Lucas, 1892

Current conservation status

Categorised as Vulnerable in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

Proposed conservation status

Endangered in Victoria

Criteria A2ce+3ce+4ce

Species Information

Description and Life History

Males grow up to 28 mm and females to 35 mm. Breeding occurs in autumn in terrestrial nests in depressions that are flooded by autumn and winter rains. Woodruff (1977) reported clutch sizes of between 119-169, with an average of 140. Tadpoles reach 34 mm TL, with metamorphosis in spring and summer after a larval period of 6-8 months (Anstis 2017). Growth rates, size and age at sexual maturity and adult survival rates are essentially unknown. However, unpublished mark-recapture data from the Healesville area suggests that the species may live for over a decade, with consistent capture of males at the same nest sites over such periods (C. Cleeland, unpubl. data). As such, adult survival rates may be high, and generation times may be relatively long compared with other Victorian anurans.

Generation Length

The generation length of the Southern Toadlet is inferred to be 5 to 15 years. This is based upon observations of extreme longevity in captivity (30 years +) and limited mark-recapture studies showing long-term return of breeding males to calling sites for this species and other closely related taxa (by P. Byrne in NSW and C. Cleeland in Vic).

Distribution

The taxon is widely distributed across southern Victoria and south-eastern South Australia, south of the Great Dividing Range. It also occurs across Tasmania, and some Bass Strait islands. In Victoria, it is restricted to the cool-temperate zone, in open forest, grasslands and swamps.

Habitat

The Southern Toadlet is affiliated with open forest, woodland, grassland and heath vegetation communities over its Victorian range, and occupies agricultural land where breeding habitat remains. Breeding habitat consists of seasonal watercourses, swamps and low-lying areas that are flooded by autumn and winter rains.

Threats

The Southern Toadlet is locally impacted by habitat loss, degradation and fragmentation, from both agricultural and urban development. More broadly, the taxon is thought to have declined sharply following the spread of chytrid fungus across south-eastern Australia beginning in the early 1980s. Ongoing impacts of chytridiomycosis are likely.

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 15 to 45 years is inferred to be 10 to 50%, based on (c) and (e) above.

The taxon is thought to have undergone significant population declines beginning in the 1980s, following a pattern analogous to that shown by other taxa susceptible to chytrid fungus. Nevertheless, declines are spatially patchy, as is the extent of information on the scale of these declines. The percentages included here are based on an analysis of the decline in Area of Occupancy (AoO) from records in the Victorian Biodiversity Atlas (VBA), under the assumption that AoO is correlated with abundance. Change in AoO was calculated by pooling records by decade from the 1970s to the present. Decline over the last 45 years was based on comparison of 1970s AoO to 2010s AoO (approximately 50%). Decline over the last 15 years is much more uncertain, as a result of a dedicated survey in 2011 in the south-west of the state (Nicholson and Peterson 2011) that produced ~150 records of the species. The lower bound has therefore been set at 10%, acknowledging the likelihood of ongoing contemporary declines across the state, despite the recognition of strong populations in some parts of the south-west.

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

Eligible under Criterion A3 as Endangered

The population reduction over the next 15 to 45 years is projected to be 10 to 50%, based on (c) and (e) above.

It is likely that some declines will continue, due to ongoing impacts of habitat change, chytridiomycosis and changed rainfall patterns. Hence the inclusion of 10% as the lower projection. The upper estimate is set at the upper end of the projected change in AoO over the next 45 years.

Eligible under Criterion A4 as Endangered

The population reduction over any 15 to 45 year period, including both past and future (up to 100 years in the future), is inferred to be 10 to 50 %, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

The assumption here is that given no change in threatening processes that have driven declines over recent years, and the potential for some of these threats to amplify (climate change induced failure of autumn and winter rains), the rate of decline seen over recent decades will continue into the future.

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:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 108,793 km² and the AoO is estimated to be 2,312 km², both of which exceed the thresholds for criterion B.

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 as Data Deficient

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

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

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