Threatened Species Assessment

Pseudemoia pagenstecheri
Tussock Skink

Taxonomy

Pseudemoia pagenstecheri (Lindholm, 1901)

Based on work by Maggie Haines (Haines et al. 2014) the populations on the High Country (HC) in the east of the state are considered to be distinct from those in the Victorian Volcanic Plains. This assessment considers only the HC populations.

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

Criterion B2ab(i,ii,iii,v)

Species Information

Description and Life History

From Robertson and Coventry (2019): The Tussock Skink is a prominently striped species, a characteristic often seen as an adaptation to grassy microhabitats. It is greyish-brown to olive brown on the back and head, with a dark brown vertebral line and usually two or more dark paravertebral lines. Lowland populations are usually heavily flecked with white and dark spots on the back and tail, whereas highland populations usually lack this pattern. There is a characteristic cream dorso-lateral stripe centred along the fourth or between the third and fourth scale row from the centre of the back - often dark-edged, this stripe starts on the base of the tail, running forward to the neck but not onto the head. There is an immaculate, broad, brown upper lateral zone, with a continuous, smooth, dark-edged mid-lateral pale stripe along the upper lip to the top of the ear then continuing behind the ear along the body onto the tail. This pale mid-lateral stripe becomes orange to red in breeding males, usually from behind the forelimb extending back onto the sides of the tail. The ventral surfaces are whitish, sometimes pale grey or bronze posteriorly. The Tussock Skink has been recorded reaching snout vent lengths up to 63 mm in highland areas.

The Tussock Skink is a diurnal heliotherm, basking on fallen timber, rocks or within grass tussocks. Like other skinks, it often folds the limbs back along the body when basking. Mating occurs in winter, and ovulation and fertilization of the eggs occurs the following spring, with the live young born in early summer to early autumn. Females in lowland populations have two to seven young (Robertson and Coventry 2019).

Generation Length

The generation length of the High Country Tussock Skink is suspected to be 2 to 4 years. Longevity and age at first reproduction are unknown for this taxon. Sexual maturity is assumed to be attained at around one year, and individuals are assumed to live for around 5 years.

Distribution

The taxon occurs on the Victorian High Country, from near Mt Wellington in the south to the Mt Cobberas area in the north-east of the State.

Habitat

Predominantly terrestrial, the Tussock Skink is usually found in grassy, treeless areas. Occurring sympatrically with its close relatives the Alpine Bog Skink and Southern Grass Skink in alpine areas, it is usually found in more open, drier, grassy or heathy microhabitats than these two species. The High Country population occurs in the cold temperate zone of the Alpine ecosystem.

Threats

The taxon used to be ubiquitous across the High Country, but has undergone severe habitat loss. Habitat has been fragmented and cleared in some places (e.g., for carparks on the Bogong High Plains), feral horses and deer are degrading its habitat, domestic horses have degraded the its habitat in Pretty Valley on the Bogong High Plains, large fires have affected much of the taxon's range in the 21st century (some areas have been burned two or more times in that period), and climate change is a mounting threat. There may be competition from congeners under a combination of increased fires and climate change, and lowland weeds may ascend upwards, further degrading the habitat. Small population size also constitutes a threat.

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:

Ineligible under Criterion A

The past population reduction does not meet the threshold for eligibility under criterion A2, and the future population reduction does not meet the threshold for eligibility under criterion A3.

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 B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 314 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas.

It is suspected to have 2 locations. Large bushfires ('megafires') in the last 80 years (1939, 2003, 2006/7) have affected large proportions of this taxon's range in the alps, and shown that a single fire can affect well over 50% of the taxon's range. Consequently, a designation of two locations here is based on the potential for two or more fires to affect the taxon's entire range in the Victorian High Country.

It has a continuing decline in (i), (ii), (iii) and (v) above, based on the impacts of the identified threats.

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

It is not possible to provide a realistic estimate of the number of mature individuals of this taxon in the Alps. This taxon can be locally abundant in suitable habitat, but many areas where it occurs have been affected by several large fires in the 21st century, and this habitat continues to be affected by feral horses and deer. Many areas of habitat have been fragmented by roads, tracks and ski infrastructure, as well as having been cleared for alpine development (lodges, carparks, roads, etc.).

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

DSE (2013). *Advisory List of Threatened Vertebrate Fauna in Victoria - 2013.* Department of Sustainability and Environment, Melbourne. Retrieved from:

https://www.environment.vic.gov.au/__data/assets/pdf_file/0014/50450/Advisory-List-of-Threatened-Vertebrate-Fauna_FINAL-2013.pdf

Haines, M. L., Moussalli, A., Stuart-Fox, D., Clemann, N., and Melville, J. (2014). Phylogenetic evidence of historic mitochondrial introgression and cryptic diversity in the genus *Pseudemoia* (Squamata: Scincidae). *Molecular phylogenetics and evolution*, 81, 86-95.

Robertson, P. and Coventry, A. J. (2019). *Reptiles of Victoria: a Guide to Identification and Ecology*. CSIRO Publishing. Clayton South