Threatened Species Assessment

Cyclodomorphus praealtus
Alpine She-oak Skink

Taxonomy

Cyclodomorphus praealtus Shea, 1995

Current conservation status

Listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*. (SAC 1996).

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

Proposed conservation status

Critically Endangered in Victoria

Criterion A3ce

Species Information

Description and Life History

The Alpine She-oak Skink is a medium-sized scincid lizard with a snout vent length up to 127 mm (N. Clemann unpublished data) with smooth, overlapping scales and four distinct but short limbs, each with five fingers or toes. Dorsal colouration is olive green to reddish-brown. The ventral surface is often orange to reddish. The taxon is diurnal and viviparous, producing up to nine young per litter in late summer or early autumn (N. Clemann unpublished data; Robertson and Coventry 2019). Its diet is believed to consist mainly of molluscs and arthropods, however small lizards and snakes, such as the White-lipped Snake (*Drysdalia coronoides*), might occasionally be consumed (Clemann 2003); a detailed dietary analysis is currently underway across three of the four Victorian populations (N. Clemann and Z. Atkins unpublished data). The taxon is known only from elevations above 1400 m (Jenny Lawrence unpublished data) in the mainland Australian alps.

Generation Length

The generation length of the Eastern She-oak Skink is estimated to be 4 to 8 years. This taxon likely attains sexual maturity in its second or third year. There are mark-recapture data of an individual that was at least 6 years of age, and probably older, but it was not an especially large adult at last capture, and grew only 26mm in snout-vent length over 5 years, suggesting that this taxon is probably long-lived (N. Clemann unpublished data).

Distribution

The Alpine She-oak Skink is endemic to NSW and Victoria. It is restricted to locations above 1400 m in the Australian Alps from the Wellington Plains (Victoria) in the south to Kiandra (NSW) in the north.

Habitat

The taxon has only been recorded from alpine tussock grasslands, alpine heathland and alpine grassy heathland, usually above the tree line, and most of these areas are either treeless or very sparsely treed (N. Clemann unpub data), although it does occur in grassy areas of very sparse Snow Gums (*Eucalyptus pauciflora*). Within these habitats it shelters in vegetation or beneath rocks. The topography in areas of known occurrence ranges from flat

plains to rolling alpine hills and because of the cold climate, the taxon usually selects sunny aspects.

Threats

The main current threats to the Alpine She-oak Skink are loss and degradation of habitat, bushfire and predation. Climate change and weeds are potential threats.

In addition to historical habitat loss, degradation and fragmentation, as well as the overarching threat of climate change, critical habitat for the Alpine She-oak Skink continues to be cleared and degraded within the Hotham alpine resort. In February 2018 a section of perhaps the highest quality habitat for this taxon was destroyed to widen the road opposite the Loch carpark (Clemann et al. 2019). Additionally, a telecommunications tower is likely to be erected immediately on top of the tiny area of high quality habitat on the summit of Mt Higginbotham. An adjacent area (Machinery Spur and Mt Loch) has returned exceptionally few captures in recent years, despite intensified sampling (N. Clemann unpublished data). This area on and around Mt Hotham must be considered to be in an extremely precarious state.

Koumoundouros et al. (2009) noted that Mt Hotham is the most genetically rich population of this taxon, but also the geographically smallest and most historically cleared and fragmented. It is probable that 'genetic rescue' will be a feature in the future conservation management of this taxon, so this genetic richness at Mt Hotham means that the fate of the taxon in this area could affect populations of the taxon elsewhere (Clemann et al. 2019). Tissue samples have been collected to undertake a detailed genetic analysis to inform this (N. Clemann unpub. data).

In March 2019 bushfires burned extensive areas of habitat on the most southerly population of this taxon (Wellington Plains), and an unknown amount of the taxon's habitat on or near Lankey/Omeo Plains on the Dargo High Plains. These impacts are yet to be fully assessed; however, impacts such as these fires underscore the inter-related importance of all known populations of this taxon. Catastrophic fire impacts on one population could conceivably necessitate reintroduction, augmentation or genetic rescue from other populations. Consequently, intentional destruction and/or degradation of the most genetically rich population at Mt Hotham is of particular concern for the conservation of this taxon.

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 12 to 24 years is estimated to be 20 to 60% (midpoint 45%), based on (a), (c) and (e) above.

There has been substantial clearing of habitat on and around Mt Hotham (Loch dam and carpark, road widening, clearing of north face of Higginbotham for lodge construction). Similarly, ongoing development of infrastructure in Falls Creek and nearby parts of the National Park has destroyed habitat. The Park has been degraded by cattle grazing, and feral horses continue to degrade the habitat on the Bogong High Plains. Deer damage is worsening across the taxon's range.

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 12 to 24 years is projected to be 50 to 85%, based on (c) and (e) above.

This is based on ongoing impacts from feral species, and habitat destruction, fragmentation and degradation by human activities, exacerbated by climate change and the impacts associated with climate change (e.g., invasive species, worsening fire regimes, thermal events and regimes, etc.).

Eligible under Criterion A4 as Endangered

The population reduction over any 12 to 24 year period, including both past and future, is estimated to be 20 to 85% (midpoint 60%), based on (a), (c) and (e) above.

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 Extent of Occurrence (EoO) is estimated to be 605 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The Area of Occupancy (AoO) is estimated to be 104 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA.

All four known subpopulations occur on 'sky islands' (sensu Koumoundouros et al. 2009), separated by valleys of unsuitable habitat and conditions. Some of these locations are further fragmented. Most notably, the populations on Mt Hotham and out to Mt Loch have been fragmented by roads, carparks, lodges, and other resort infrastructure

(although similar fragmentation by roads and tracks occurs at the other populations as well). It is probable that the main road through the Bogong High Plains has fragmented populations there.

The taxon is estimated to have one to four locations, as it is known from four areas in Victoria, and bushfires could severely impact one or several of these.

It 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:

Eligible under Criterion C1 as Endangered

It is estimated that there are 250 to 3,500 mature individuals. Surveys and monitoring indicate that some areas (on and around Mt Hotham, and the Dargo High Plains) contain only small amounts of habitat, and the taxon occurs at relatively low densities. Occurrences can be patchy in other areas, although the total habitat there is larger (e.g. Bogong High Plains and Wellington Plains), but densities in these areas are still relatively low.

There is an estimated continuing decline of 25 to 50% 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

It is estimated that there are 250 to 3,500 mature individuals and 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

Clemann, N. (2003). Flora and Fauna Guarantee Action Statement for the Alpine She-oak Skink *Cyclodomorphus praealtus*. Melbourne, Victoria: Department of Sustainability and Environment.

Clemann, N., Atkins, Z. and Gilbert, D. (2019). *Monitoring and survey of threatened reptiles, frogs and threatening processes in the Victorian alps 2017- 2018 season*. Report to Zoos Victoria. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning.

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Koumoundouros, T., Sumner, J., Clemann, N., and Stuart-Fox, D. (2009). Current genetic isolation and fragmentation contrasts with historical connectivity in an alpine lizard (*Cyclodomorphus praealtus*) threatened by climate change. *Biological Conservation*, 142(5), 992-1002.

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

SAC (1996). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 393 *Cyclodomorphus praealtus*