Threatened Species Assessment

Morelia spilota spilota
Diamond Python

Taxonomy

Morelia spilota spilota (Lacépède, 1804)

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1993).

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

Proposed conservation status

Critically Endangered in Victoria

Criteria A2ce+3ce+4ce

Species Information

Description and Life History

From Robertson and Coventry (2019): Diamond Pythons are normally black above, with yellow or cream dots on each scale, and series of sometimes regular, small, dark-edged, yellow or cream patches on the back. This subspecies is yellow below, with numerous small black patches. There is a distinct 'spur' on either side of the vent, these being the last vestiges of hindlimbs. Diamond Pythons grow to a total length of about three metres.

The Diamond Python can be active at quite low temperatures, occasionally being seen basking on sunny winter days. Home ranges to over 120 hectares have been recorded. Sheltering in hollow logs, and dense vegetation, it has little protection from the frequent fires prevalent in Gippsland - rock outcrops may be important refugia. Its diet consists mainly of small to medium-sized warm-blooded prey, with possums, bandicoots and water rats recorded in Victoria - some reptiles and frogs are eaten as well. Male combat does not occur, although aggregations of several individuals have been seen at mating time. Mating occurs in early spring, with females laying 9 to 54 (but typically less than 30, Greer 1997) eggs in late spring or summer, then brooding the clutch until hatching after six to ten weeks.

Generation Length

The generation length of the Diamond Python is estimated to be 10 to 15 years. Several species of Australian pythons have lived at least 14 years in captivity, some individuals of larger pythons much longer (over 20 years) (Torr 2000). Diamond Pythons have been reported to live longer than 17 years (Harlow and Grigg, 1984, in Greer, 1997). This subspecies attains sexual maturing at a snout-vent length of approximately 150 cm (Slip and Shine 1988). If sexual maturity is attained at perhaps 5 or 6 years and the snake breeds every 3 or 4 years, then it seems reasonable to assume that the time taken to completely replace the population in undisturbed pre-European conditions could be 10-15 years.

Distribution

The Diamond Python in Victoria is restricted to the warm temperate zone south of the Great Dividing Range in far East Gippsland.

Habitat

The taxon occurs in Dry Sclerophyll Forest, Heathland, Banksia Woodland and Coastal Scrub ecosystems (Robertson and Coventry 2019).

Threats

The taxon is threatened by frequent fires (including bushfires and planned burning), fox predation, timber harvesting activities and habitat damage caused by deer. Under climate change, there may be even more frequent and intense fires in East Gippsland. Diamond Pythons are thought to have been severely affected by the bushfires of 2019/20, but the exact impacts are yet to be determined.

Spatial analysis of likely habitat for Diamond Python indicates that 63% occurs within the CAR reserve system, including parks and reserves, special protection zones and areas excluded from harvesting by prescription under the Victorian Code of Practice for Timber Production 2014 (the Code). Species-specific protections for Diamond Python are included in the Code. In recent years, modified harvesting and forest regeneration practices have been implemented in native forest that are designed to further mitigate the potential threat from forestry operations to threatened species and their habitats.

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 Critically Endangered

The population reduction over the past 30 to 45 years is suspected to be 50 to 80%, based on (c) and (e) above.

The taxon has undergone fire impacts throughout its range in the last few decades, so it is very likely that animals have been lost. Perhaps 90% of its known range was burnt in 2019/20, and given the severity of the fires, ground refugia such as logs are likely to have been burnt, leaving the animals unprotected during and after the fires.

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

Eligible under Criterion A3 as Critically Endangered

The population reduction over the next 30 to 45 years is suspected to be 50 to 90%, based on (c) and (e) above.

It is plausible that the Diamond Python will decline in Victoria as its habitat is impacted by altered fire, and due to elevated predation levels caused by feral predators. Over a 45 year window, it is probable that climate change will affect this taxon in Victoria.

Eligible under Criterion A4 as Critically Endangered

The population reduction over any 30 to 45 year period, including both past and future is suspected to be 40 to 90%, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

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 Vulnerable

The Extent of Occurrence (EoO) is estimated to be 7485 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is suspected to be severely fragmented and is inferred to have three locations. It has a continuing decline in (i), (ii), (iii) and (v) above, based on the impacts of the identified threats,

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) is estimated to be 113 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it is severely fragmented, has 3 locations, and has a continuing decline in (i), (ii), (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:

Ineligible under Criterion C as Data Deficient

There is insufficient evidence to determine the number of mature individuals. Diamond Pythons are infrequently encountered in Victoria, and they have not been the subject of any targeted study. Consequently, it is not possible to estimate 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:

Eligible under criterion D2 as Vulnerable

The taxon is suspected to be very restricted.

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

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