



Baseline inventory of herpetofauna from the Naneghat lateritic plateau in the Western Ghats, Maharashtra, India

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Date of receipt: 17.01.2026

Date of acceptance: 05.05.2026

ABSTRACT

Amphibians and reptiles are vital components of ecological networks, acting as both predators and prey, and serving as sensitive bioindicators of environmental health. The Western Ghats, a UNESCO World Heritage Site and a global biodiversity hotspot, harbour exceptional levels of herpetofaunal endemism; yet, many microhabitats remain poorly explored. Here we present the first systematic assessment of herpetofaunal diversity on the Naneghat plateau (~750 m asl), Maharashtra, India. Field surveys were conducted during the monsoon seasons from June 2020 to June 2025 using standardized visual encounter surveys, random walks, and active microhabitat searches. A total of 53 species were recorded, comprising 9 anurans, 13 lizards, and 31 snakes, across 18 families. According to the IUCN Red List (2025), 44 species are listed as Least Concern, four have not yet been assessed, while *Varanus bengalensis*, *Uropeltis bicaenata*, *Gongylophis conicus*, and *Eryx johnii* are categorized as Near Threatened. Of the recorded species, 34 are protected under the Wildlife (Protection) Amendment Act, 2022. This study provides a baseline inventory for this underexplored landscape and underscores the need for long-term monitoring and site-specific conservation strategies.

Key words: Baseline inventory, conservation, herpetofauna, Naneghat plateau

INTRODUCTION

Herpetofauna (amphibians and reptiles) play a crucial role in ecosystem stability by regulating invertebrate populations, contributing to nutrient cycling, and serving as indicators of habitat quality (Gibbons et al., 2000). Globally, herpetofaunal populations are experiencing severe declines, primarily due to habitat degradation, climate change, over exploitation, and emerging diseases (Wake and Vredenburg, 2008).

India supports a rich assemblage of herpetofauna, with 454 amphibian species (Dinesh et al., 2023) and 778 reptile taxa (Mohapatra et al., 2024). The Western Ghats alone host over 227 reptile species, nearly half of

which are endemic (Myers et al., 2000). However, northern sectors of the Western Ghats, particularly the basaltic plateaus and lateritic outcrops remain under represented in ecological surveys, despite being highly vulnerable to anthropogenic pressures including agriculture, infrastructure expansion, and tourism (Aphale et al., 2019; More et al., 2025).

The study aims to document the herpetofaunal diversity of the Naneghat plateau, Maharashtra. Specifically, it seeks to: (1) establish a baseline inventory of species, (2) assess their conservation status under the IUCN Red List and the Indian Wildlife (Protection) Act (as amended), and (3) highlight the ecological and conservation significance of this plateau habitat within the Western Ghats biodiversity hotspot.

MATERIALS AND METHODS

Study area

The Naneghat plateau is located in Pune district, Maharashtra ($19^{\circ}16'45.63''\text{N}$, $73^{\circ}41'19.96''\text{E}$ to $19^{\circ}17'53.29''\text{N}$, $73^{\circ}40'26.37''\text{E}$), at an elevation of ~ 750 m and covering ~ 0.75 km². The landscape is characterized by basaltic outcrops, scrub vegetation, forest patches, paddy fields, and steep escarpments, with annual rainfall ranging from 700 to 1200 mm. The plateau is flanked by sacred groves and reserve forests (Rahangdale and Rahangdale, 2014) as shown in Fig. 1.

Survey methods

Field surveys were conducted during the southwest monsoon between June 2020 and

June 2025. Standardized visual encounter surveys (Heyer et al., 1994), random trail walks (Lambe, 1984), and active microhabitat searches (Rolfe and McKenzie, 2000) were employed across diurnal (1600–1900 h) and nocturnal (1900–0300 h) periods. Surveys focused on key microhabitats, including streamside vegetation, rocky crevices, and arboreal niches.

Species were photographed and identified using standard taxonomic keys. (Daniel, 2002; Whitaker and Captain, 2008; Das and Das, 2017). Geographic coordinates were recorded using the NoteCam mobile application and mapped in QGIS (v3.44), shown in Fig. 1. Conservation status was assessed using the IUCN Red List (2025) and the Wildlife (Protection) Amendment Act, 2022.

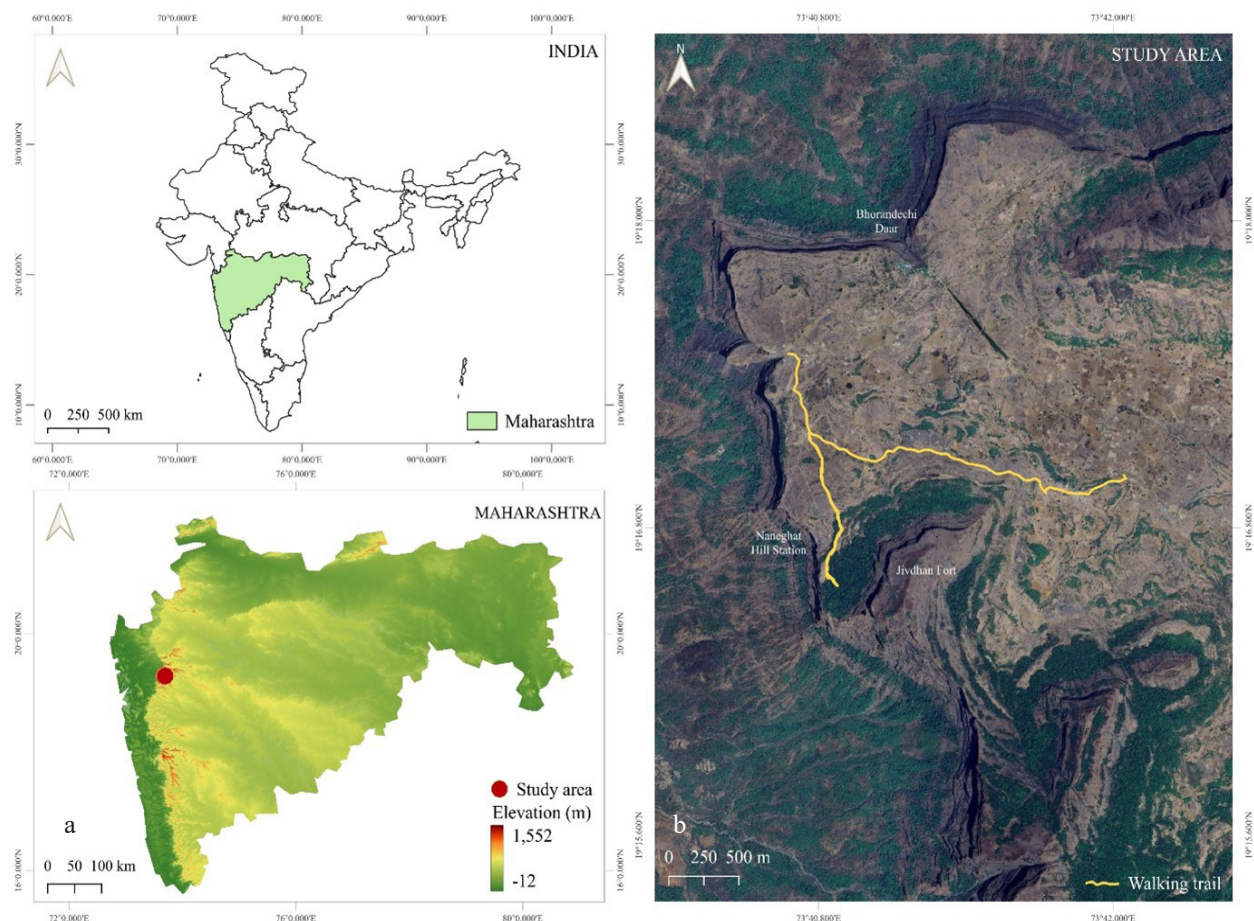


Fig. 1 (a, b). Location and topography of the study area showing major landmarks and the walking trail (yellow line) in Maharashtra, India

RESULTS AND DISCUSSION

A total of 53 herpetofaunal species belonging to 18 families were documented from the Naneghat plateau (Table 1), comprising 9 anurans (5 families, 9 genera; shown in Fig. 2), 13 lizards (5 families, 9 genera as shown in Fig. 3), and 31 snakes (8 families, 23 genera; shown in Fig. 4). Among amphibians, Dicroglossidae was the most represented family (4 species), followed by Rhacophoridae (2 species), while Ranidae, Ranixalidae, and Bufonidae were represented by one species each. Reptiles comprised 44 species across 13 families, with Colubridae

being the most diverse (14 species), followed by Gekkonidae (6 species); Elapidae, Scincidae, Natricidae, Uropeltidae, and Viperidae (3 species each); Erycidae, Agamidae, and Typhlopidae (2 species each); Varanidae, Chamaeleonidae, and Sibynophiidae (1 species each). Among the recorded taxa, *Varanus bengalensis*, *Chamaeleo zeylanicus*, *Daboia russelii*, *Naja naja*, *Fowlea piscator*, *Ptyas mucosa*, and *Eryx johnii* have the highest legal protection under Schedule I, while two anuran species, one lizard, and 24 snake species are listed under Schedule II of the Wildlife (Protection) Amendment Act, 2022.

Table 1. Annotated list of herpetofauna recorded in Naneghat plateau, India, during the study period

Class/Family	Name of Species	WPA	IUCN
AMPHIBIA: ANURA			
Dicroglossidae			
	Paddy field cricket frog (<i>Minervarya agricola</i>)	NS	LC
	Indian bullfrog (<i>Hoplobatrachus tigerinus</i>)	II	LC
	Indian skittering frog (<i>Euphlyctis cyanophlyctis</i>)	II	LC
	Maskey's burrowing frog (<i>Sphaerotheca maskeyi</i>)	NS	LC
Ranidae			
	Wide-spread fungoid frog (<i>Hylarana bahuvistara</i>)	NS	LC
Ranixalidae			
	Matheran leaping frog (<i>Indirana leithii</i>)	NS	LC
Rhacophoridae			
	Maharashtra bush frog (<i>Raorchestes ghatei</i>)	NS	LC
	Indian tree frog (<i>Polypedates maculatus</i>)	NS	LC
Bufonidae			
	Common Indian toad (<i>Duttaphrynus melanostictus</i>)	NS	LC
REPTILIA: SQUAMATA (lizards)			
Chamaeleonidae			
	Indian chameleon (<i>Chamaeleo zeylanicus</i>)	I	LC
Agamidae			
	Oriental garden lizard (<i>Calotes versicolor</i>)	NS	LC
	Roux's forest lizard (<i>Monilesaurus rouxii</i>)	NS	LC

Gekkonidae			
	Aaron bauer's house gecko (<i>Hemidactylus aaronbaueri</i>)	NS	LC
	Dakota's leaf-toed gecko (<i>Hemidactylus triedrus</i>)	NS	LC
	Amarasinghe's house gecko (<i>Hemidactylus amarasinghei</i>)	NS	NE
	Spotted leaf-toed gecko (<i>Hemidactylus maculatus</i>)	NS	LC
	Deccan spotted gecko (<i>Cyrtodactylus deccanensis</i>)	II	LC
	Common house gecko (<i>Hemidactylus frenatus</i>)	NS	LC
Varanidae			
	Bengal monitor lizard (<i>Varanus bengalensis</i>)	I	NT
Scincidae			
	Lined supple skink (<i>Riopa lineata</i>)	NS	LC
	Keeled Indian mabuya (<i>Eutropis carinata</i>)	NS	LC
	Bronze mabuya (<i>Eutropis macularia</i>)	NS	LC
REPTILIA: SQUAMATA (snakes)			
Viperidae			
	Common bamboo pit viper (<i>Craspedocephalus gramineus</i>)	NS	LC
	Indian saw-scaled viper (<i>Echis carinatus</i>)	II	LC
	Russell's viper (<i>Daboia russelii</i>)	I	LC
Elapidae			
	Common krait (<i>Bungarus caeruleus</i>)	II	LC
	Spectacled cobra (<i>Naja naja</i>)	I	LC
	Slender coral snake (<i>Calliophis melanurus</i>)	II	LC
Natricidae			
	Asiatic water snake (<i>Fowlea piscator</i>)	I	LC
	Buff striped keelback (<i>Amphiesma stolatum</i>)	II	LC
	Green keelback (<i>Rhabdophis plumbicolor</i>)	II	LC
Colubridae			
	Beddome's cat snake (<i>Boiga beddomei</i>)	II	LC
	Forsten's cat snake (<i>Boiga forsteni</i>)	II	LC
	Common cat snake (<i>Boiga trigonata</i>)	II	LC
	Northern vine snake (<i>Ahaetulla borealis</i>)	II	NE
	Slender-nosed vine snake (<i>Ahaetulla oxyrhyncha</i>)	II	NE
	Oriental ratsnake (<i>Ptyas mucosa</i>)	I	LC
	Common wolf snake (<i>Lycodon aulicus</i>)	II	LC
	Travancore wolf snake (<i>Lycodon travancoricus</i>)	II	LC
	Indian trinket snake (<i>Coelognathus helena</i>)	II	LC

	Common bronzeback tree snake (<i>Dendrelaphis tristis</i>)	II	LC
	Streaked kukri snake (<i>Oligodon taeniolatus</i>)	II	LC
	Tillack's kukri snake (<i>Oligodon tillacki</i>)	II	NE
	Günther's racer (<i>Platyceps gracilis</i>)	II	DD
	Banded racer (<i>Platyceps plinii</i>)	NS	LC
Uropeltidae			
	Bombay shieldtail (<i>Uropeltis macrolepis</i>)	II	LC
	Elliot's shieldtail (<i>Uropeltis ellioti</i>)	II	LC
	Bicatenate shieldtail (<i>Uropeltis bicatenata</i>)	II	NT
Erycidae			
	Common sand boa (<i>Gongylophis conicus</i>)	II	NT
	Red sand boa (<i>Eryx johnii</i>)	I	NT
Typhlopidae			
	Brahminy blind snake (<i>Indotyphlops braminus</i>)	II	LC
	Beaked worm snake (<i>Grypotyphlops acutus</i>)	II	LC
Sibynophiidae			
	Dumeril's black-headed snake (<i>Sibynophis subpunctatus</i>)	II	LC

WPA = Wildlife (Protection) Amendment Act, 2022: I = Schedule I, II = Schedule II, NS = Non Schedule. IUCN (International Union for Conservation of Nature and Natural Resources), Red List of Threatened Species (IUCN 2025); NE = Not Evaluated, DD = Data Deficient, LC = Least Concern, NT = Near Threatened

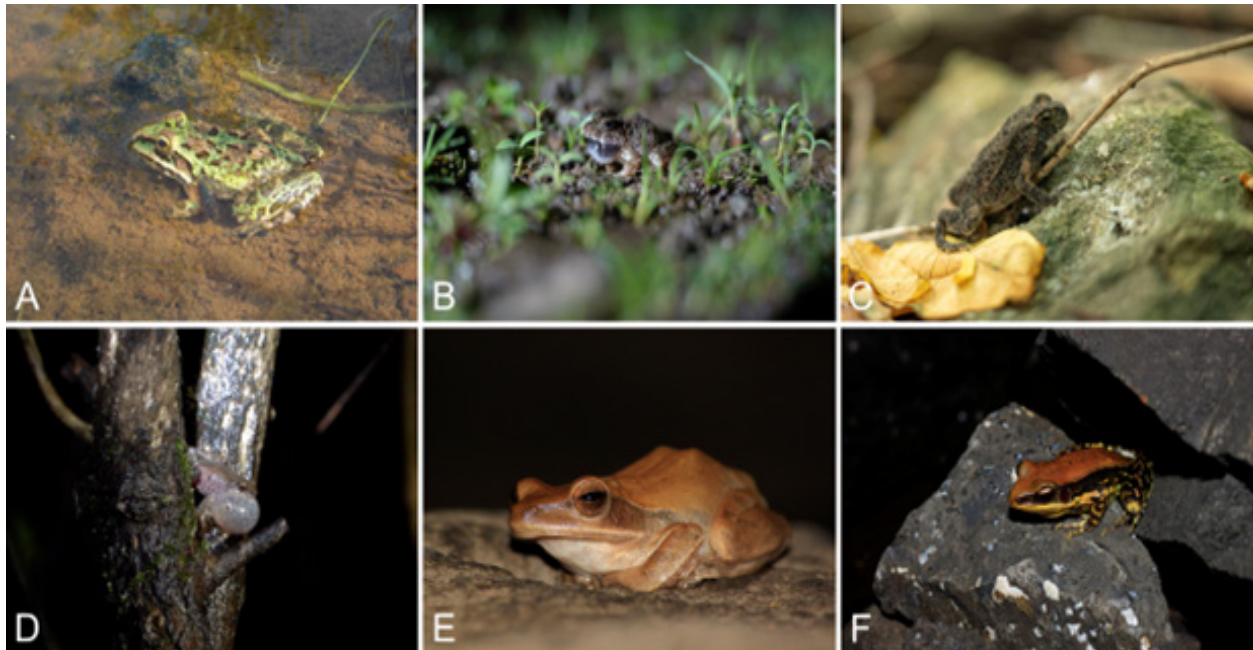


Fig. 2. A. *Hoplobatrachus tigerinus*, B. *Minervarya agricola*, C. *Duttaphrynus melanostictus*, D. *Raorchestes ghatei*, E. *Polypedates maculatus*, F. *Hylarana bahuvistara*



Fig. 3. A. *Chamaeleo zeylanicus*, B. *Varanus bengalensis*, C. *Cyrtodactylus deccanensis*, D. *Hemidactylus triedrus*, E. *Eutropis macularia*, F. *Riopa lineata*



Fig. 4. A. *Craspedocephalus gramineus*, B. *Echis carinatus*, C. *Bungarus caeruleus*, D. *Naja naja*, E. *Calliophis melanurus*, F. *Rhabdophis plumbicolor*, G. *Boiga beddomei*, H. *Ahaetulla borealis*, I. *Lycodon travancoricus*, J. *Platyceps gracilis*, K. *Uropeltis bicatenata*, L. *Eryx johnii*, M. *Sibynophis subpunctatus*, N. *Oligodon tillacki*, O. *Amphiesma stolatum*

The high herpetofaunal diversity recorded from the Naneghat plateau is notable given its limited geographic extent and highlights the ecological value of plateau ecosystems in the northern Western Ghats. The presence of

threatened and legally protected species further underscores the conservation importance of this landscape. Basaltic plateaus and lateritic outcrops, though often overlooked in regional conservation planning, provide a mosaic of microhabitats that