



A Survey of Snake Diversity in Bardiya National Park and Associated Corridor Forest in Nepal

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Of the more than 3,500 known species of snakes (Uetz et al. 2021), nearly 90 have been recorded in Nepal (Shah and Tiwari 2004; Kästle et al. 2013; Sharma et al. 2013). However, many of the records from Nepal are based on either presence-only surveys or anecdotal information. Herein we provide a checklist of snakes found in and around Bardiya National Park (BNP) and its buffer zone.

Bardiya National Park (28°15'–28°35.5'N, 80°10'–81°45'E; elevational range 152–1,564 m asl) (Fig. 1) covers an area of 968 km² in the southwestern lowlands of Lumbini Province, Bardiya District, Nepal (Bhujju et al. 2007; DNPWC 2021). A buffer zone of 327 km² with forested areas and farmland surrounding the park was added in 1996 and another 180-km² area in the north was included in 2011. The climate is temperate with dry winters and hot summers. Biomes include tropical and subtropical grasslands, savannas, shrublands, and tropical and subtropical coniferous forests, although no forests are intact. The recorded biodiversity is 839 species of plants and 667 species of animals.

We collected information on snakes collected from BNP and its buffer zone in 2010–2021 from the database of the National Trust for Nature Conservation, Bardiya Conservation Program (NTNC-BCP) rescue records and by reviewing the literature, recording opportunistic sightings, interviewing local residents, and gathering data posted on various social media platforms. We evaluated all data and included only reliable information documented by photographs acquired from snake handlers and nature guides of the Buffer Zone User Group (BZUG) or technicians and staff of the NTNC-BCP. We identified species using published guidebooks (Dutta and Manamendra-Arachchi 1996; Shah and Tiwari 2004; Sharma et al. 2013; Bhattarai et al. 2020).

We recorded 24 species of snakes in eight families in and around BNP and its buffer zone (Table 1; Fig. 2). Twenty-two of the species were among the 27 recorded by Shah and Tiwari (2004) in and around Bardiya National Park, and 16

were among the 18 listed by Subedi et al. (2021) in the Chure Region. We recorded eight species not listed by Subedi et al. (2021) and three species that had not been recorded by Shah and Tiwari (2004). Subedi et al. (2021) listed two species and Shah and Tiwari (2004) six species we did not find during our survey. When compared to other areas in Nepal, the species diversity in the vicinity of BNP corresponds to the 19 (18 in common) recorded in Parsa National Park (Bhattarai et al. 2018), 25 (16) throughout the Chure Range (Bhattarai et al. 2020), and 30 (22) in Shuklaphanta National Park (Rawat et al. 2020).

Nepal’s snake diversity and that of BNP in particular are threatened by habitat degradation, nest damage, roadkills, and indiscriminate killing attributable to unfavorable perceptions of snakes (Shah and Gautam 2010). Many Nepalese do not distinguish venomous and non-venomous snakes and assume that all snakes are dangerous and must be killed (Thapa 2007). Also, research and conservation efforts frequently are consid-

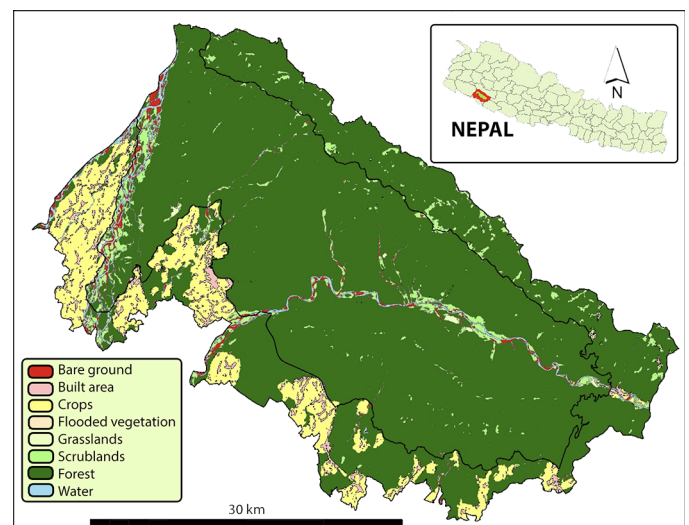


Fig. 1. Bardiya National Park and buffer zone in the southwestern lowlands of Lumbini Province, Bardiya District, Nepal.

Table 1. Species of snakes recorded in in Bardiya National Park and its buffer zone during this study compared to species recorded in the Chure Region by Subedi et al. (2021) and in and around Bardiya National Park by Shah and Tiwari (2004). IUCN Red List assessments (IUCN 2022) and inclusion in CITES Appendices I, II, or III (CITES 2021) are noted. Abbreviations for IUCN Red List status are VU = Vulnerable, NT = Near Threatened, and LC = Least Concern.

Species	IUCN Red List	CITES Appendix	This Study	Subedi et al. 2021	Shah and Tiwari 2004
Typhlopidae					
Diard's Blindsnake (<i>Argyrophis diardii</i>)	LC	—	—	—	X
Brahminy Blindsnake (<i>Indotyphlops braminus</i>)	LC	—	X	—	X
Pythonidae					
Burmese Python (<i>Python bivittatus</i>)	VU	II	X	X	X
Indian Rock Python (<i>Python molurus</i>)	NT	I	—	—	X
Erycidae					
Common Sandboa (<i>Eryx conicus</i>)	NT	II	X	X	X
Red Sandboa (<i>Eryx johnii</i>)	NT	II	X	X	X
Colubridae					
Green Vinesnake (<i>Ahaetulla nasuta</i>)	LC	—	X	X	X
Forsten's Catsnake (<i>Boiga forsteni</i>)	LC	—	X	—	X
Common Catsnake (<i>Boiga trigonata</i>)	LC	—	X	X	X
Golden Flying Snake (<i>Chrysopelea ornata</i>)	LC	—	—	X	X
Common Trinket Snake (<i>Coelognathus helena</i>)	LC	—	X	—	X
Common Bronze-backed Treesnake (<i>Dendrelaphis tristis</i>)	LC	—	X	X	X
Common Wolfsnake (<i>Lycodon aulicus</i>)	LC	—	X	X	X
Twin-spotted Wolfsnake (<i>Lycodon jara</i>)	LC	—	X	—	X
Barred Wolfsnake (<i>Lycodon striatus</i>)	LC	—	X	—	X
Banded Kukri (<i>Oligodon arnensis</i>)	—	—	X	X	—
Oriental Ratsnake (<i>Ptyas mucosa</i>)	LC	II	X	X	X
Cantor's Black-headed Snake (<i>Sibynophis sagittarius</i>)	LC	—	X	X	X
Natricidae					
Buff-striped Keelback (<i>Amphiesma stolidum</i>)	LC	—	X	X	X
Checkered Keelback (<i>Fowlea piscator</i>)	LC	III	X	X	X
Bar-necked Keelback (<i>Fowlea schnurrenbergeri</i>)	LC	III	X	—	—
Homolopsidae					
Smooth Watersnake (<i>Enhydris enhydris</i>)	LC	—	—	—	X
Siebold's Watersnake (<i>Ferania sieboldii</i>)	LC	—	X	—	X
Elapidae					
Common Krait (<i>Bungarus caeruleus</i>)	LC	—	X	X	X
Banded Krait (<i>Bungarus fasciatus</i>)	LC	—	X	X	X
Lesser Black Krait (<i>Bungarus lividus</i>)	LC	—	X	—	—
Spectacled Cobra (<i>Naja naja</i>)	LC	II	X	X	X
King Cobra (<i>Ophiophagus hannah</i>)	VU	II	—	X	X
Viperidae					
Russel's Viper (<i>Daboia russelii</i>)	LC	III	X	X	X
White-lipped Pitviper (<i>Trimeresurus albolabris</i>)	LC	—	—	—	X



Fig. 2. Snakes found in and around Bardiya National Park and its buffer zone: Brahminy Blindsnake (*Indotyphlops braminus*) (A), Burmese Python (*Python bivittatus*) (B), Common Sandboa (*Eryx conicus*) (C), Red Sandboa (*Eryx jobinii*) (D), Forsten’s Catsnake (*Boiga forsteni*) (E), Common Catsnake (*Boiga trigonata*) (F), Common Trinket Snake (*Coelognathus helena*) (G), Common Bronze-backed Treesnake (*Dendrelaphis tristis*) (H), Common Wolfsnake (*Lycodon aulicus*) (I), and Twin-spotted Wolfsnake (*Lycodon jara*) (J). Photographs by Anjali Mahatara (A, F, G, J), Umesh Paudel (B, H), Rabin Kadariya (C, D, I), and Khusiram Choudhary (E).



Fig. 2 (cont.). Snakes found in and around Bardiya National Park and its buffer zone: Barred Wolfsnake (*Lycodon striatus*) (K), Banded Kukri (*Oligodon arnensis*) (L), Oriental Ratsnake (*Ptyas mucosa*) (M), Cantor's Black-headed Snake (*Sibynophis sagittarius*) (N), Buff-striped Keelback (*Amphiesma stolatum*) (O), Checkered Keelback (*Fowlea piscator*) (P), Bar-necked Keelback (*Fowlea schnurrenbergeri*) (Q), Siebold's Watersnake (*Feranias sieboldii*) (R), Common Krait (*Bungarus caeruleus*) (S), Banded Krait (*Bungarus fasciatus*) (T), Lesser Black Krait (*Bungarus lividus*) (U), and Spectacled Cobra (*Naja naja*) (V). Photographs by Ramraj Choudhary (K, L, O, S), Rabin Kadariya (M, U), Anjali Mahatara (N, R), Umesh Paudel (P, V), Sushila Mahatara (Q), and Hotel Tiger Tops (T).

ered low priorities (Baral et al. 2020). We strongly encourage efforts to changes Nepalese attitudes about snakes and conservation awareness initiatives emphasizing their value.

Acknowledgements

We thank the National Trust for Nature Conservation, Bardiya National Park, and local partner organizations for their support. We are grateful to Sushila Mahatara, Anjali Mahatara,

staff of the NTNC-BCP, Phiru Lal Choudhary, Khushiram Choudhary, Ramraj Choudhary, and members of the local community for help in the field and support of this project.

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