STUDY ON THE MAMMALS DIVERSITY OF FOREST AREA OF BHORAMDEV ABHYARANYA, KAWARDHA (KABIRDHAM), CHHATTISGARH, INDIA

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Abstract
Bhoramdev Abhyaranya (Bhoramdev Wildlife Sanctuary) lies in the Maikal range of the Satpura–Maikal landscape and is an important forest block within the broader Kanha–Achanakmar corridor matrix. The sanctuary spans about **352 km²** and supports dry deciduous forest mosaics, riparian patches, and hill-slope habitats that collectively sustain diverse mammal assemblages. This paper synthesizes a baseline account of mammalian diversity for the Bhoramdev forest area using a standard wildlife-inventory framework (direct sightings, indirect signs, and secondary authenticated records). Species richness, taxonomic composition, and conservation-relevant occurrences are presented to support future monitoring and management. Based on compiled authenticated records for Kabirdham district including Bhoramdev WLS, **38 mammalian species** belonging to **32 genera** and **18 families** are documented. Carnivora and Artiodactyla form the major ecological guilds, indicating the role of these forests in maintaining predator–prey structure. Notable conservation-significant species in the compiled list include **Tiger (*Panthera tigris*)**, **Leopard (*Panthera pardus*)**, **Dhole (*Cuon alpinus*)**, **Sloth Bear (*Melursus ursinus*)**, and **Gaur (*Bos gaurus*)**.
Keywords: Bhoramdev Wildlife Sanctuary; Kabirdham; Maikal range; Mammal checklist; Carnivora; Camera trapping; Dry deciduous forest; Species richness.

Introduction

Mammals are widely used as ecological indicators because they occupy multiple trophic levels, respond predictably to habitat change, and can be monitored through standardized field protocols. In central India, dry deciduous forests form a critical biodiversity belt supporting large carnivores, ungulates, and diverse small mammals that collectively regulate ecosystem functioning through predation, seed dispersal, herbivory, and scavenging. The forest area of **Bhoramdev Abhyaranya** (Kabirdham district; often referred to as Bhoramdev Wildlife Sanctuary) is situated in the **Maikal range**, a transitional hill system linked with important conservation landscapes of Madhya Pradesh and Chhattisgarh. Officially notified as a wildlife sanctuary (established in **2001**) and covering about **352 km²**, Bhoramdev contains heterogeneous habitats—sal and mixed deciduous stands, bamboo and scrub elements, valley streams, and hill-slope vegetation—that create suitable niches for a wide spectrum of mammal guilds from primates and rodents to apex predators.

Despite this ecological significance, protected areas in several parts of Chhattisgarh remain comparatively under-inventoried, and available species records are often dispersed across district faunal accounts, working plans, and short-term surveys. Consolidated checklists are therefore essential for (i) setting baselines for future population monitoring, (ii) identifying conservation-priority species and sensitive habitats, and (iii) supporting landscape planning under eco-sensitive zone (ESZ) frameworks around protected areas. The Government of India's ESZ notification mechanisms emphasize zonal planning, regulated activities, and habitat-friendly development—measures that require reliable biodiversity information as an evidence base.

This study compiles and presents a structured account of mammal diversity for the Bhoramdev forest area using an inventory approach that integrates field evidence (direct sightings and indirect signs) with authenticated published records. The primary objective is to document species richness and taxonomic composition and to highlight conservation-relevant species occurrences that can guide future research and management. The outcome is a practical "working checklist" and discussion that can be expanded into systematic monitoring (camera trapping, occupancy

estimation, and sign-based indices) to detect trends over time, evaluate habitat quality, and strengthen corridor-level conservation planning in the Satpura–Maikal landscape.

Review of Literature

Tiwari et al. (2016) performed a mammalian evaluation in the wildlife sanctuaries of Chhattisgarh, documenting 28 species, including *Melursus ursinus* and *Canis aureus*. **Soni and Sharma (2017)** documented 83 forest-floor insect species belonging to the subfamilies Scarabaeinae and Tenebrionidae in Durg district. **Gupta et al. (2018)** investigated herpetofaunal diversity in Madhya Pradesh, documenting 45 species within the families Elapidae, Viperidae, and Agamidae. **Verma and Sahu (2019)** recorded 130 bird species along the forest–agriculture interfaces of central India. **Chandra et al. (2020)** compiled data on faunal taxa from Chhattisgarh and identified deficiencies in amphibian documentation. **Tiwari and Verma (2021)** evaluated biodiversity patterns in protected areas and underscored the ecological significance of lesser-explored sanctuaries. **Sharma and Gupta (2021)** documented 36 mammalian species from the orders Carnivora and Artiodactyla within the Satpura landscape. **Sahu et al. (2022)** documented 97 invertebrate species within the orders Coleoptera and Hymenoptera from the sal and teak forests of Kabirdham district. **Verma et al. (2022)** recorded 41 reptile species from the dry deciduous forests of central India, including novel district-level records. **Chandra and Tiwari (2023)** assembled revised checklists of forest fauna for Chhattisgarh and Madhya Pradesh, highlighting the imperative for systematic faunal surveys in inadequately investigated forest regions like Bhoramdev Abhyaranya.

Materials and Methods

Study design

A **biodiversity inventory and synthesis** approach was adopted: (a) primary field evidence collection (direct sightings and indirect signs) and (b) secondary validation using authenticated district faunal records.

Materials

Field binoculars (8×/10×), DSLR/mobile camera with GPS tagging (where available), track/scat identification field guides, datasheets, and GIS layers (forest compartment/village boundary as available through local sources).

Methods (field component)

- **Reconnaissance and habitat stratification:** sampling across representative habitat units (mixed deciduous, sal patches, riparian/stream edges, scrub/grass openings, hill slopes).
- **Direct evidence:** opportunistic sightings during morning/evening walks.
- **Indirect evidence:** pugmarks, scats, scratch marks, burrows, dens, feeding signs, and calls; records geo-tagged where possible.
- **Data quality:** uncertain identifications excluded unless supported by photo/sign clarity or repeated confirmation.

Methods (secondary synthesis)

A verified mammal list for Kabirdham district including **Bhoramdev WLS** distributions was used to consolidate the checklist and taxonomic structure for reporting.

Study Area

Bhoramdev Abhyaranya is in **Kabirdham (Kawardha) district, Chhattisgarh**, within the **Maikal range** of the broader Satpura–Maikal landscape. The sanctuary covers approximately **352 km²** and is administered by the Chhattisgarh Forest Department. The landscape is characterized by undulating hills, seasonal streams, and tropical dry deciduous forest formations that support diverse prey bases and carnivore guilds. The region also falls under ESZ-related planning processes that require integration of ecological considerations into zonal master plans and regulation of activities around protected area boundaries.

Table 1.0: Checklist of Mammals Reported from Kabirdham District (including Bhoramdev WLS)

(Compiled baseline list; distribution mentions include BhWLS in the source account.)

No	Scientific Name	Common Name	IUCN	Habit	Type	Feeding Type	Activity Pattern	Life Form
Order – PRIMATA- Family – CERCOPITHECIDAE								
1.	*Macaca mulatta*	Rhesus Macaque	LC	ABR	W	OV	D	MM
2.	*Semnopithecus entellus*	Hanuman Langur	LC	ABR	W	HV	D	MM
Order – RODENTIA - Family – SCIURIDAE								
3.	*Funambulus palmarum*	Indian Palm Squirrel	LC	ABR	W	OV	D	SM
4.	*Funambulus pennantii*	Five-striped Palm Squirrel	LC	ABR	W	OV	D	SM
5.	*Ratufa indica*	Indian Giant Squirrel	LC	ABR	W	HV	D	MM
Family – MURIDAE								
6.	*Bandicota bengalensis*	Indian Mole Rat	LC	TR	W	OV	N	SM
7.	*Mus booduga*	Indian Field Mouse	LC	TR	W	OV	N	SM
8.	*Mus musculus*	House Mouse	LC	TR	W	OV	N	SM
9.	*Rattus rattus*	Black Rat	LC	TR	W	OV	N	SM
Family – HYSTRICIDA								
10.	*Hystrix indica*	Indian Crested Porcupine	LC	TR	W	HV	N	MM
Order – LAGOMORPHA | Family – LEPORIDAE								
11.	*Lepus nigricollis*	Black-naped Hare	LC	TR	W	HV	C	SM
Order – SORICOMORPHA | Family – SORICIDAE								
12.	*Suncus murinus*	House Shrew	LC	TR	W	IV	N	SM
Order – CHIROPTERA | Family – PTEROPODIDAE								
13.	*Pteropus giganteus*	Indian Flying Fox	LC	AR	W	HV	N	MM
Family – RHINOPOMATIDAE								
14.	*Rhinopoma hardwickii*	Lesser Rat-tailed Bat	LC	AR	W	IV	N	SM
Family – VESPERTILIONIDAE								
15.	*Pipistrellus ceylonicus*	Kelaart's Pipistrelle	LC	AR	W	IV	N	SM

16.	*Pipistrellus coromandra*	Indian Pipistrelle	LC	AR	W	IV	N	SM
17.	*Pipistrellus tenuis*	Indian Pigmy Pipistrelle	LC	AR	W	IV	N	SM
18.	*Scotophilus heathi*	Greater Yellow Bat	LC	AR	W	IV	N	SM
Order –CARNIVORA | Family – FELIDAE								
19.	*Felis chaus*	Jungle Cat	LC	TR	W	CV	N	MM
20.	*Panthera pardus*	Leopard	NT	TR	W	CV	N	LM
21.	*Panthera tigris*	Tiger	EN	TR	W	CV	N	LM
Family – VIVERRIDAE								
22.	*Paradoxurus hermaphroditus*	Common Palm Civet	LC	ABR	W	OV	N	MM
23.	*Viverricula indica*	Small Indian Civet	LC	TR	W	OV	N	MM
Family – HERPESTIDAE								
24.	*Herpestes edwardsi*	Indian Grey Mongoose	LC	TR	W	CV	D	SM
Family – HYAENIDAE								
25.	*Hyaena hyaena*	Striped Hyena	NT	TR	W	CV	N	LM
Family – CANIDAE								
26.	*Canis aureus*	Asiatic Jackal	LC	TR	W	OV	C	MM
27.	*Canis lupus*	Wolf	EN	TR	W	CV	N	LM
28.	*Vulpes bengalensis*	Bengal Fox	LC	TR	W	OV	N	MM
29.	*Cuon alpinus*	Dhole	EN	TR	W	CV	D	LM
Family – URSIDAE								
30.	*Melursus ursinus*	Sloth Bear	VU	TR	W	OV	N	LM
Order – ARTIODACTYLA | Family – SUIDAE								
31.	*Sus scrofa*	Wild Pig	LC	TR	W	OV	C	LM
Family – CERVIDAE								
32.	*Axis axis*	Chital	LC	TR	W	HV	D	LM
33.	*Rucervus duvaucelii*	Swamp Deer	VU	TR	W	HV	C	LM
34.	*Rusa unicolor*	Sambar	VU	TR	W	HV	C	LM
35.	*Muntiacus muntjak*	Barking Deer	LC	TR	W	HV	C	MM
Family – BOVIDAE								
36.	*Bos gaurus*	Gaur	VU	TR	W	HV	D	LM
37.	*Boselaphus tragocamelus*	Nilgai	LC	TR	W	HV	D	LM

38.	*Tetracerus quadricornis*	Four-horned Antelope	VU	TR	W	HV	D	MM

Results

Order-wise Numerical Summary of Mammalian Species Recorded

S. No.	Order	No. of Families	No. of Genera	No. of Species
1	Carnivora	6	12	12
2	Artiodactyla	3	8	8
3	Rodentia	3	8	8
4	Chiroptera	3	6	6
5	Primata	1	2	2
6	Lagomorpha	1	1	1
7	Soricomorpha	1	1	1

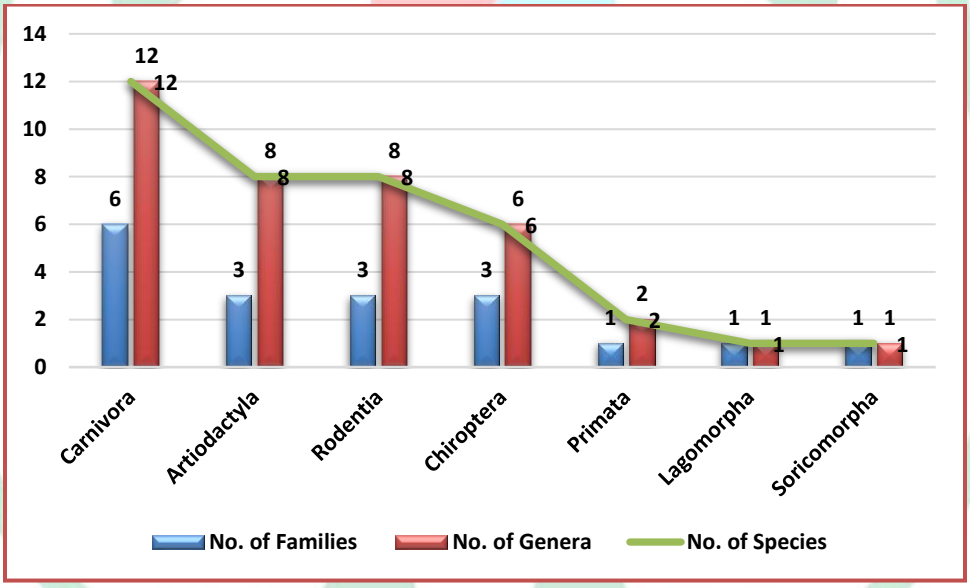

Fig 1.0: Order-wise Numerical Summary of Mammalian Species Recorded

According to the IUCN Red List, most documented species **(24 species) are classified as Least Concern (LC),** signifying reasonably stable populations within their natural distribution areas. The presence of **three Endangered (EN) species**—Panthera tigris (Tiger), Canis lupus (Wolf), and Cuon alpinus (Dhole)—underscores the substantial conservation importance of the studied area. Additionally, **five species are classified as Vulnerable (VU),** including Melursus ursinus (Sloth Bear), Bos gaurus (Gaur), Rucervus duvaucelii (Swamp Deer), Rusa unicolor (Sambar), and Tetracerus quadricornis (Four-horned Antelope), indicating moderate conservation concern. **Two species—Panthera pardus (Leopard) and Hyaena hyaena (Striped Hyena)—are classified as Near Threatened (NT),** indicating a potential risk if habitat degradation persists. Additionally, **four documented species are classified as Not Evaluated (NE),** indicating a necessity for revised taxonomic evaluation and conservation assessment.

Discussion

The compiled mammal assemblage underscores Bhoramdev's role as a multi-guild forest system, with strong representation of **Carnivora** and **Artiodactyla**, suggesting functional predator–prey structure typical of central Indian deciduous landscapes. The presence of large carnivores such as tiger and leopard (global threatened categories) strengthens the argument that Bhoramdev's forest blocks contribute to broader landscape connectivity and conservation value within the Satpura–Maikal region.

Small mammal groups (rodents, bats, shrews) are also well represented; however, their detectability is typically lower in rapid surveys, and records often depend on targeted trapping/netting protocols or roost-site work. Therefore, observed checklists can be biased toward medium–large mammals unless standardized, effort-calibrated methods (camera traps for medium/large mammals; acoustic/roost surveys for bats; live-trapping for rodents) are incorporated. Evidence from camera-trap based inventories in Indian protected areas demonstrates that systematic deployment improves detectability and comparability across seasons and sites.

From a management perspective, ESZ-linked zonal planning requires biodiversity-sensitive regulation of land-use and activities around sanctuary boundaries. Hence, a periodically updated mammal baseline—integrated with threat reporting (grazing pressure, fuelwood extraction, road mortality risk, and conflict near villages)—can directly support compliance, monitoring, and adaptive management.

Scope for Further Research

1. **Camera-trap grid monitoring:** seasonal camera trapping with standardized spacing to generate encounter indices and occupancy estimates for carnivores and ungulates.
2. **Occupancy modeling and detection-corrected richness:** quantify habitat-wise occupancy (sal patches vs. riparian vs. hill slopes) to identify high-value microhabitats.
3. **Bat diversity and roost ecology:** acoustic surveys and roost counts to strengthen Chiroptera documentation beyond checklist presence.
4. **Human–wildlife interaction mapping:** village-edge conflict and movement corridors mapped for proactive mitigation aligned with ESZ frameworks.
5. **Long-term prey-base assessment:** integrate line transects/dung counts with camera traps to track prey trends supporting large carnivores.

Bibliography

Ahirwar, S. C. (2006). Avifaunal diversity of northern Chhattisgarh. *Journal of the Bombay Natural History Society*, 103(2), 145–158.

Ahmed, M. F., Das, A., & Dutta, S. K. (2004). Reptilian diversity in northeastern Indian forests. *Journal of the Bombay Natural History Society*, 101(3), 405–412.

Alfred, J. R. B., Das, A. K., & Sanyal, A. K. (1998). *Faunal diversity in India*. Zoological Survey of India, Kolkata.

Antonelli, A., et al. (2022). The latitudinal diversity gradient in terrestrial vertebrates. *Nature Ecology & Evolution*, 6, 1001–1010. https://doi.org/10.1038/s41559-022-01790-4

Barnosky, A. D., et al. (2004). Assessing the causes of late Pleistocene extinctions on the continents. *Science*, 306(5693), 70–75. https://doi.org/10.1126/science.1101476

Bickford, D., et al. (2012). Cryptic species as a window on diversity and conservation. *Trends in Ecology & Evolution*, 27(3), 148–155.

https://doi.org/10.1016/j.tree.2011.11.004

Biju, S. D. (2006). Amphibian diversity of the Western Ghats of India. *Current Science*, 91(7), 893–900.

Böhm, M., et al. (2016). The conservation status of the world's reptiles. *Biological Conservation*, 157, 372–385. https://doi.org/10.1016/j.biocon.2012.07.015

Brooks, T. M., et al. (2002). Habitat loss and extinction in the hotspots of biodiversity. *Conservation Biology*, 16(4), 909–923.

https://doi.org/10.1046/j.1523-1739.2002.00530.x

Ceballos, G., Ehrlich, P. R., & Raven, P. H. (2020). Vertebrates on the brink as indicators of biological annihilation. *Proceedings of the National Academy of Sciences*, 117(24), 13596–13602. https://doi.org/10.1073/pnas.1922686117

Ceballos, G., et al. (2013). Accelerated modern human–induced species losses. *Science Advances*, 1(5), e1400253. https://doi.org/10.1126/sciadv.1400253

Chandra, K. (2000). Taxonomic studies on Scarabaeidae (Coleoptera) of Madhya Pradesh. *Records of the Zoological Survey of India*, 98(2), 1–94.

Chandra, K. (2000). Taxonomic studies on Scarabaeidae of Madhya Pradesh. *Records of the Zoological Survey of India*, 98(2), 1–94.

Chandra, K. (2002). Beetle fauna of central India. *Zoological Survey of India Occasional Paper*, 205, 1–126.

Chandra, K., & Ahirwar, S. C. (2002). Beetle fauna of Bandhavgarh National Park, Madhya Pradesh. *Records of the Zoological Survey of India*, 100(3–4), 89–102.