

Mammals in urban forest: A checklist from Forestry Complex Hetauda, Makawanpur, Nepal

Forestry Complex (27.41 N & 85.02 E) is located in Hetauda Sub-Metropolitan city which is spread over an area of 97 ha consists of mixed forest, grassland, Karra River and open land. Based on field observation, the forest is dominated by *Shorea robusta*, *Schima wallichii*, *Trewia nudiflora* and planted forest of Eucalyptus species whereas *Imperata cylindrica* and *Saccharum spontaneum* are found on grassland. The complex supports 132 species of birds (Bajagain et al. 2020), two species of turtles (Luitel et al. 2021), and 11 species of serpents (Pradhan et al. 2020). However, the database of mammals in this area is inadequate for assessing conservation needs. Hence, we conducted the reconnaissance, indirect sign survey and camera trap survey to prepare the baseline data which provides the foundation for researchers to understand the interactions between different species and their environment. This information can be used to develop more targeted management strategies that



Indian Crested Porcupine.



Small Indian Civet near a dead Large Indian Civet.



Large Indian Civet.

Table 1. Camera trap station details.

	Station name	Dominant vegetation	
		Local name	Scientific name
1	Station 1 (Near the den of Jackal)	Gutel	<i>Trewia nudiflora</i>
2	Station 2 (Waterhole)	Eucalyptus	<i>Eucalyptus spp.</i>
3	Station 3 (Kill Site, Dead Large Indian Civet)	Sal	<i>Shorea robusta</i>
4	Station 4	Chilaune	<i>Schima wallichii</i>
5	Station 5	Sal	<i>Shorea robusta</i>
6	Station 6 (Grassland)	Dubo	<i>Cynodon dactylon</i>
7	Station 7 (Near Community and Karra Khola)	Sal	<i>Shorea robusta</i>
8	Station 8 (Near Community Karra Khola)	Sal	<i>Shorea robusta</i>



Spotted Deer.

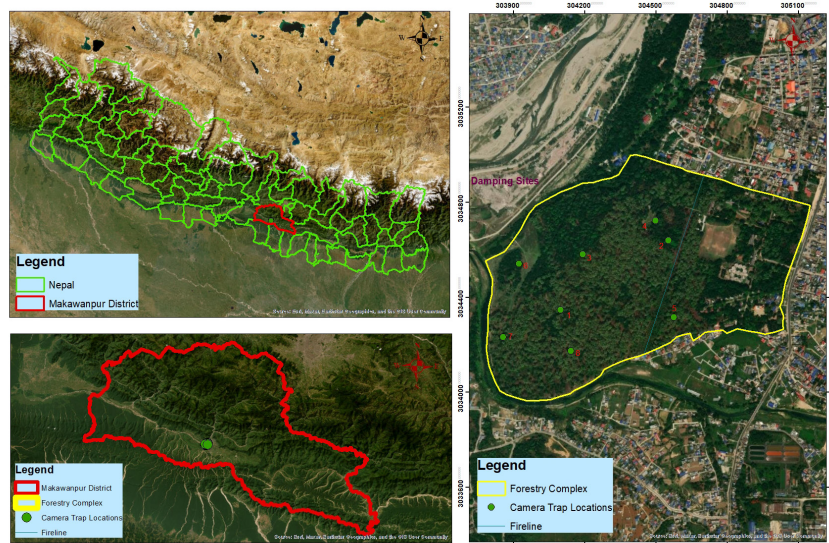


Rhesus Macaque. © Nikeet Pradhan.

address the specific needs of each species in the complex. The camera trap was set up in eight stations (Table 1) above 30–55 cm in height from ground level in February, March, April (2021–2022) (Burton et al. 2015; Molloy 2018). It is placed during the night to early morning (1900–0700 h) considering high anthropogenic disturbances during the day by students as well as nearby community. The camera was manually set to capture both photographs and videos “3 photographs and a video” at a single triggered event with a time interval 15 seconds. Our study revealed 13 mammalian species from the forestry complex located at the core area of the city. This represents 6.13% of mammals found within the country. Majority of the species recorded belonged

to family Viverridae followed by Cercopithecidae (Table 2). Among these recorded species, the Leopard Cat *Prionailurus bengalensis* is found dead in road kill in East-West Highway which is protected by the National Park and Wildlife Conservation Act, 2029 (1973). Similarly, Spotted Deer is the maximum photo captured species followed by Asian Palm Civet. Indian Hare *Lepus nigricollis* was recorded through evidence of rescue on campus. Mainly this species is hunted for food and captured by residential people nearby Forestry Complex. In the preliminary and camera trap surveys of the forest, visitors, firewood collectors and feral dogs are frequently seen in the forest.

Despite its limited area, the presence of 13 mammalian species indicates this urban forest provides a suitable habitat for mammalian species. There has been limited studies on mammals outside the protected areas inhabiting urban environments. A study of mammals in Banpale forest of Pokhara Metropolitan city revealed 19 species of mammals (Bist et al. 2017). Another study conducted by



Forestry Complex with camera trap stations.



Feral Dogs near waterhole.



Indian Grey Mongoose.



Road-killed Leopard Cat.



Golden Jackal.



Indian Hare.

Chaudhary (2018) found 28 species of mammals in the urban landscape of Bharatpur. Situated in urban areas, these forests play a crucial role in biodiversity conservation, serving as essential habitats for mammals (Gallo et al. 2017) urging us to take necessary interventions for the conservation of such areas. The observation of a dead Leopard Cat during our study holds significant conservation implications. This species is nationally categorized as Vulnerable and is listed under the National Parks and Wildlife Conservation Act, 2029 (1973) as a protected species of Nepal (Jnawali et al. 2011). The finding of a dead Leopard Cat within our study area aligns with the observations of (MoEF 2020), who noted that road infrastructure impedes the movement of mammals, leading to threats such as road accidents and habitat fragmentation. Even though the species was only recorded once and could possibly be a visitor, the roadkill incident raises the importance of habitat connectivity especially in the context of urban landscape. This patch of forest has been long used by the locals to

Table 2. List of mammal species recorded in Forestry Complex, Hetauda.

	Common name	Scientific name	Nepali name	Family	Evidence	National status	Global Red List status
1	Indian Hare	<i>Lepus nigricollis</i>	खैरो खरायो	Leporidae	Photographs (Rescue)	Least Concern(LC)	LC
2	Five-striped Palm Squirrel	<i>Funambulus pennanti</i>	पाँचधार्के लोखार्के	Sciuridae	Sighted	LC	LC
3	Indian Crested Porcupine	<i>Hystrix indica</i>	जुरे दुस्सी	Hystricidae	Camera Trap (CT) Photographs	Data Deficient (DD)	LC
4	Small Indian Civet	<i>Viverricula indica</i>	सानो नीबुरिलो	Viverridae	CT Photographs	LC	LC
5	Masked Palm Civet	<i>Paguma larvata</i>	गाजले नीबुरिलो		Sighted (Pradhan et al. 2020)	LC	LC
6	Asian Palm Civet	<i>Paradoxurus hermaphroditus</i>	ताडी नीबुरिलो		CT Photographs	LC	LC
7	Leopard Cat	<i>Prionailurus bengalensis</i>	चरी बाघ	Felidae	Road Kill	Vulnerable (VU)	LC
8	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	डुलो न्याउरीसूसो	Herpestidae	Photographs	LC	LC
9	Golden Jackal	<i>Canis aureus</i>	सयाल	Canidae	CT Photographs	LC	LC
10	Yellow-throated Marten	<i>Martes flavigula</i>	मलसाँसुरो	Mustelidae	Sighted (Visitor)	LC	LC
11	Terai Grey Langur	<i>Semnopithecus hector</i>	तराई लंगुर	Cercopithecidae	Sighted (Visitor)	LC	Near Threatened (NT)
12	Rhesus Macaque	<i>Macaca mulatta</i>	रातो बाबर		Photographs	LC	LC
13	Spotted Deer	<i>Axis axis</i>	चितिला/चित्ती	Cervidae	CT Photographs	VU	LC

collect dry leaves, fodder, firewood and mushrooms. It has several trails within the forest and a nearby open dumping site which attracts a lot of feral dogs. There have been several cases of direct killing of Spotted Deer by these feral dogs. Though the exact number of deaths of Spotted Deer by feral dogs is still unavailable, cases of these species being harassed, chased and killed by the feral dogs are evident. The unregulated open dumping site holds the potential to harbor diseases, for which wildlife may act as a vector therefore, a proper management of such spaces is a must. Moreover, the trails often used for morning walks and the grassland as picnic spots could disrupt wildlife behaviors and habitats. Therefore, effective management of this area becomes paramount for conserving both its ecological balance and the diverse species that inhabit it. Establishing a comprehensive conservation action plan is imperative, including



Firewood collector.



Spotted Deer killed by feral dogs.

strategies like controlling feral dogs, preventing human-induced fires and raising awareness in the local

community about coexisting with wildlife is essential for the long-term sustainability of this urban ecosystem.

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