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NOTES ON THE STATUS OF MAMMALIAN FAUNA OF THE LAWACHARA NATIONAL PARK, BANGLADESH

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ABSTRACT

This paper presents a checklist of mammalian species of the Lawachara National Park, Bangladesh with notes on their status and conservation threats. A total of 39 species belonging to seven orders and 21 families were recorded. Of these, Carnivora (38%), Rodentia (24%), Primates (15%), Chiroptera (13%) and Artiodactyla (5%) were major. Thirty six per cent of the recorded mammals were common followed by uncommon (26%), rare (23%) and very common (15%). Nationally, 51% of the recorded species face different categories of threats followed by not threatened (28%) and data deficient (21%). In terms of global status, 23% of the species are threatened and 73% species are under lower risk category. Primates, herbivores and carnivores face severe threats primarily stemming from habitat loss and fragmentation, wildlife poaching and human disturbance. Arresting illegal tree felling and over-exploitation of forest resources, restoration of degraded habitats and regulative tourism activities should urgently be addressed for long-term conservation of mammalian species in the park.

Key words: Bangladesh, mammals, Lawachara National Park, status, threats.

INTRODUCTION

Bangladesh is blessed with 121 species of mammals (IUCN 2000, Khan 2008). The presence of such a large number of species in a small densely populated country (160 millions human in 147570 km^2) has been possible due to its geographic location in between Indo-Himalayas and Indo-China sub-regions. However, existing mammalian population indicates a clearly deteriorating trend during the past several decades (Siddiqui and Faizuddin 1981, Islam *et al.* 2006). This decline of mammalian population is being further accelerated by diverse and pervasive anthropogenic threats throughout their ranges. To date, 8% of the mammalian species have undergone to extinction from Bangladesh and 36% have been categorized as threatened (IUCN 2000). In addition, 44% of the mammalian species have been put under data deficient category, meaning that we have no information of their status and distribution in the country (IUCN 2000). But species occurrence and their status have always been proven worth to integrate into management and conservation activities. Despite having large number of studies over the last three decades in the Lawachara National Park (LNP) and adjoining areas (Feeroz 1999, Islam *et al.* 2006, 2008, Aziz 2007, Aziz and Feeroz 2007, Aziz *et al.* 2008), no consolidated checklist of mammals have come to light. Previously, all these studies were primarily

focused on ecology, status and distribution, food and feeding behaviour of primates including some other aspects. As a result, there is an incomplete understanding of what mammalian species occur in the park, a deficiency in knowing how to manage those species for long-term conservation. To supplement this gap, current studies attempted to provide a preliminary checklist of the mammalian species with notes on threats they face and suggesting recommendations to ameliorate those threats.

STUDY AREA

The Lawachara National Park, a part of the West Bhanugach Forest Reserve, is located approximately 160 km north east of Dhaka and 60 km south of the city of Sylhet in the civil administrative units of Kamalgonj Police Station and Maulvi Bazar District of Sylhet Forest Division (Fig. 1). The park is situated within 24°030´-24°032´N and 91°037´-91°039´E coordinates under the bio-ecological zone of 9b-Sylhet Hills (Nishat *et al.* 2002). The current notified area of the park covers 1250 ha and additional 281 ha of West Bhanugach Reserved Forest have been proposed for including along with the existing areas (FSP, 2000). The forest of the park is of semi-evergreen type which originally supported an indigenous vegetation cover of mixed tropical evergreen trees. Previously, almost all of the original forest cover has been removed or substantially altered and thus turned into a secondary forest type. The old plantations date back to around 1920's and gradually have developed a multistoried forest strata including undergrowth, creepers and naturally occurring tree species. Over the years, the oldest vegetation area have taken the structure of natural forests. In terms of human use, five other separated area of natural forests (~130 ha) have been under betel leaf cultivation by the inside ethnic communities. More than hundred species of plants have so far been identified from the park forests (Leech and Ali 1997). Overall tree density was recorded as 528.5/ha. The canopy height varies from 10 to 30 m (Islam *et al.* 2006). Average maximum temperature (33.6°C) was recorded in March and average minimum temperature of 10°C in January. The highest rainfall (456 mm) was recorded in June during the study period (Aziz 2007).

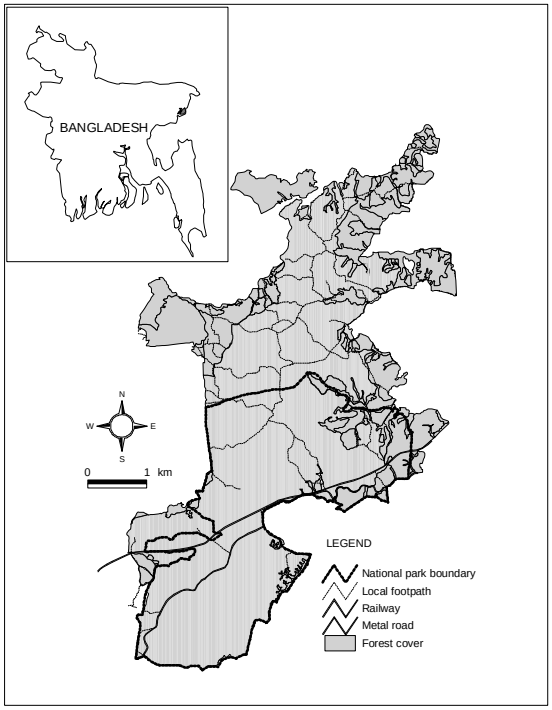

Fig. 1. Lawachara National Park, Bangladesh.

MATERIALS AND METHODS

This study was carried out between 2005 and 2007 to determine the presence of mammalian species in the LNP by using different standard approaches. The necessity of various methods arises due to diversity of mammalian species that occurred in the park. The following different methods were employed during this study.

Transect survey: The transect survey was conducted using existing forest paths, visitor trails or streams crossing different habitat types of the park following Islam *et al.* (2006) and Aziz (2007). Author with team members and local assistants walked slowly from dawn to dusk following transects. Local assistant of the Lawachara punji

located inside the LNP, helped finding out potential habitats of cryptic mammals that increased the likelihood of spotting as much mammalian species as possible. During traversing through transects, a 10 min pause was made to listen calling of mammals or to scan surrounding canopy for determining presence of mammals. This transect walking was repeated covering all existing paths, visitor trails, streams crisscrossed the park to ensure exhaustive count. Digital DSC-H50 Sony *Cybershot* camera was also used for taking photographs for detail identification. Visual observations were aided with binoculars (12×50) whenever necessary.

Sign survey: The presence of mammalian species was ascertained by the presence of different signs left by animals. For this survey, presence of quills, scats, tracks, trails, hair/fur, feeding signs, etc. were recorded and analyzed by using standard protocols. Different habitat types, water holes, streams, resting and feeding areas were emphasized for sign survey.

Capture survey: Mist nests were deployed for capturing bats in different habitat types, homesteads of two communities located inside the park, and park staff houses. The nests were deployed from 16.30 h to 20.30 h for a total of 9 trap nights in 6 locations. Bats captured were immediately released from the net after taking morphometric measurements following Bates and Harrison (1987) and unidentified individuals were preserved with 70% alcohol for skull analysis. For capturing rats and mice, five rat traps were posted with baits within the houses of the forest staff and also on the trees in the forests. Captured animals were measured and identified with help of the Book of Indian Animals (Prater 1980).

Photo card interview: Photo card interview has been a useful method to determine the species presence or absence for wildlife species (Aziz *et al.* 2008). In this study, randomly selected respondents of different stakeholders such as forest resource user groups, forest patrolling groups, members of co-management council and co-management committee, eco-guides were interviewed with pictorial guides and photographs of likely species of mammals. Forest user groups (fuel wood collectors, daily workers involved with forest management, beneficiaries of social forestry practices, nursery owners) were selected randomly from Lawachara and Magurchara Punji located inside the park, Tipra Para located southwest, Garo Basti located northwest, and Kalapur village located northwest of the national park. In addition, few key informants were interviewed to substantiate information provided by respondents. For identification of the mammalian species, colourful photographs were developed in addition to the Book of Indian Animals (Prater 1980, Aziz *et al.* 2008).

Status assessment: Current status of the mammalian species was assessed by combined metric of visual sightings during transect walking, frequency of respondent sightings and signs of occurrence. Assessment rating was determined as very common (>75% sightings), common (50-74% sightings), uncommon (25-49% sightings) and rare (<24% sightings). National and global status of the recorded species has been analysed by using status assessment carried out by the IUCN (2000) and IUCN (2006) respectively.

RESULTS

A total of 39 mammalian species under seven orders and 21 families were recorded during this study (Table 1). The highest number of species was recorded from the order Carnivora (38%) while lowest from Insecta (3%) and Lagomorpha (3%). Of the 21 families, Muridae (24%), Viverridae (24%), Felidae (19%), Pteropidae (14%), Scuirridae (14%) and Herpestidae (14%) were major. Under the Carnivora, a total of 14 species belonging to six families were known with

highest number from the Viverridae (36%) followed by Felidae (29%) and Herpestidae (21%). The Viverrids were mostly rare and uncommon. Among felids, the *Prionailurus viverrinus* was fairly common while the remaining two were rare and uncommon. The *Herpestes auropunctatus* and *H. edwardsi* under Herpestidae were fairly common while *H. urva* was rare. The *Ursus thibetanus* has nearly disappeared, however, few fecal signs and respondent opinions were noted. Respondents also have sighted the *Martes flavigula* in the park which can be the first record for Bangladesh. Among rodents, five species of rats and mice, three species of squirrels and one species of porcupine were recorded. Of the squirrels, both *Callosciurus pygerythrus* and *Dremomys lokriah* were fairly common while remaining *Petaurista magnificus* was extremely rare. The *Vandeleuria oleracea* was uncommon and noticed at several occasions on the trees just before and after sun set while remaining species were caught from the houses of BFD staff and Khasia communities. The *Hystrix indica* was recorded by presence of their quills and feeding signs in the agricultural farms located next to the park boundary. Of the primates, the *Macaca leonina*, *Macaca mulatta* and *Trachypithecus pileatus* were commonly observed while the *Trachypithecus phayrei* and *Nycticebus bengalensis* were uncommon and rare respectively. Five species of chiropterans were recorded with a good population of all four species except the Indian Flying Fox which was found coming in the park to forage just before dusk. Among artiodactyls, the *Sus scrofa* was found with a good population but *Muntiacus muntjak* has become extremely rare.

Table 1. Checklist of mammalian fauna (Class: Mammalia) of the Lawachara National Park of Bangladesh with notes on their status

SN	Family	Scientific Name	English Name	Local Name	Status[1]		
					This study	IUCNB 2000	IUCN 2006
ORDER: INSECTIVORA							
1.	Soricidae	*Suncus murinus*	House Shrew	Chika/Chucho	C, D	NO	LC
ORDER: CHIROPTERA							
2.	Pteropidae	*Cynopterus sphinx*	Short-nosed Fruit Bat	Bocha Kola Badur	V, C	DD	LC
3.	Pteropidae	*Pteropus giganteus*	Indian Flying Fox	Badur	V, D	NO	LC
4.	Pteropidae	*Rousettus leschenaulti*	Fulvus Fruit Bat	Kola Badur	C, C	DD	LC
5.	Megadermatidae	*Megaderma lyra*	Greater False Vampire	Daini Badur	V, C	NO	LC
6.	Vespertilionidae	*Pipistrellus coromandra*	India Pipistrelle	Chamchika	C, C	NO	LC
ORDER: PRIMATES							
7.	Loridae	*Nycticebus bengalensis*	Bengal Slow Loris	Lojjawati Banor	R, P	CR	VU
8.	Cercopithecidae	*Macaca mulatta*	Rhesus macaque	Banor	V, D	VU	LC
9.	Cercopithecidae	*Macaca leonina*	Pig-tailed Macaque	Ultoleji Banor	C, D	CR	VU
10.	Colobidae	*Trachypithecus phayrei*	Phayre's Leaf Monkey	Chosmapora Hanuman	U, D	CR	EN
11.	Colobidae	*Trachypithecus pileatus*	Capped Langur	Mukhpora Hanuman	C, D	EN	VU
12.	Hylobatidae	*Hoolock hoolock*	Western Hoolock Gibbon	Ulluk	V, D	CR	VU

ORDER: CARNIVORA							
13.	Canidae	*Canis aureus*	Asiatic Golden Jackal	Pati Shial	C, D	VU	LC
14.	Felidae	*Felis chaus*	Jungle Cat	Ban Biral	U, P	EN	LC
15.	Felidae	*Prionailurus bengalensis*	Leopard Cat	Chita Biral	U, P	DD	LC
16.	Felidae	*Prionailurus viverrinus*	Fishing Cat	Mecho Biral	C, P	EN	EN
17.	Felidae	*Neofelis nebulosa*	Clouded Leopard	Gecho Bagh	R, P	CR	VU
18.	Herpestidae	*Herpestes auropunctatus*	Small Indian Mongoose	Benji	C, D	NO	LC
19.	Herpestidae	*Herpestes edwardsi*	Common Mongoose	Bara Benji	C, D	VU	LC
20.	Herpestidae	*Herpestes urva*	Crab-eating Mongoose	Kakrabhuk Benji	R, D	EN	LC
21.	Ursidae	*Ursus thibetanus*	Asiatic Black Bear	Kalo Bhalluk	R, P	EN	VU
22.	Viverridae	*Arctictis binturong*	Binturong	Gecho Bhalluk	R, P	CR	VU
23.	Viverridae	*Paguma larvata*	Masked Palm Civet	Ghanda Gokul	R, D	EN	LC
24.	Viverridae	*Paradoxurus hermaphroditus*	Common Palm Civet	Ghanda Gokul	R, D	VU	LC
25.	Veverridae	*Viverra zibetha*	Large Indian Civet	Bagdash	U, P	EN	NT
26.	Veverridae	*Viverricula indica*	Small Indian Civet	Khatash	U, P	VU	LC
27.	Mustelidae	*Martes flavigula*	Yellow-throated Marten	--	P	--	LC
ORDER: ARTIODACTYLA							
28.	Suidae	*Sus scrofa*	Wild Boar	Shuar	V, D	NO	LC
29.	Cervidae	*Muntiacus muntjak*	Barking Deer	Maya Harin	U, D	EN	LC
ORDER: RODENTIA							
30.	Sciuridae	*Callosciurus pygerythrus*	Irrawardy Squirrel	Badami Kathbirali	V, D	NO	LC
31.	Sciuridae	*Dremomys lokriah*	Orange-bellied Himalayan Squirrel	Kalo Kathbirali	V, D	DD	LC
32.	Sciuridae	*Petaurista magnificus*	Hodgon's Giant Flying Squirrel	Uranta Kathbirali	R, P	DD	NT
33.	Muridae	*Mus musculus*	House Mouse	Nengti Indur	C, D	NO	LC
34.	Muridae	*Rattus rattus*	Common House Rat	Indur	C, D	NO	LC
35.	Muridae	*Vandeleuria oleracea*	Asiatic Long-tailed Climbing Mouse	Gecho Idur	U, D	DD	LC
36.	Muridae	*Bandicota bengalensis*	Lesser Bandicoot Rat	Indur	U, D	NO	LC
37.	Muridae	*Bandicota indica*	Greater Bandicoot Rat	Baro Indur	U, D	NO	LC
38.	Hystricidae	*Hystrix indica*	Indian Crested Porcupine	Shojaru	C, S	EN	LC
ORDER: LAGOMORPHA							
39.	Leporiade	*Lepus nigricollis*	Rufous-tailed Hare	Khargosh	U, P	EN	LC

[1]**Status Code:** V-Very Common, C-Common, U-Uncommon, R-Rare; DD-Data Deficient, NO/NT-Not Threatened, LC-Least Concern, VU-Vulnerable, EN-Endangered, CR-Critically Endangered; D-Direct sighting, C-Capture, P-People sighting, S-Sign occurrence

In terms of status assessed of the recorded mammalian species, 36% species were common followed by uncommon (26%), rare (23%) and very common (15%). According to IUCN (2000), 51% of the recorded species face different categories of threats followed by not threatened (28%) and data deficient (21%). Of the threatened species, 15% species were critically endangered, 23% endangered and 13% vulnerable. In terms of global status assessed by IUCN (2006), 23% of the known species are threatened comprising of endangered (5%) and vulnerable (18%) categories. Furthermore, 73% species are under lower risk category comprising of least concerned (72%) and not threatened (5%) (Fig. 2).

Threats to mammals and their habitats are diverse and pervasive in the LNP. Unlimited demands for forest resources of the surrounding human population are tremendous and posing serious threats to mammals and their habitats. Habitat degradation and fragmentation, wildlife poaching and disturbance were the major threats identified during this study. There are strong evidences that illegal timber extraction has been commonplace in the LNP. Field observations suggest that some organised groups consisting of poor local people backing and persuaded by local timber merchants and influential elite are involved with this illegal tree felling. Besides timber poaching, non-timber forest products (NTFPs) were being heavily exploited by large number of people regularly for household use or for selling in the local market. In addition, betel leaf cultivation practices by the Khasia tribes inside the LNP is another threat to wildlife and forest ecosystem which involve weeding of forest floor and lopping of lower branches of trees regularly.

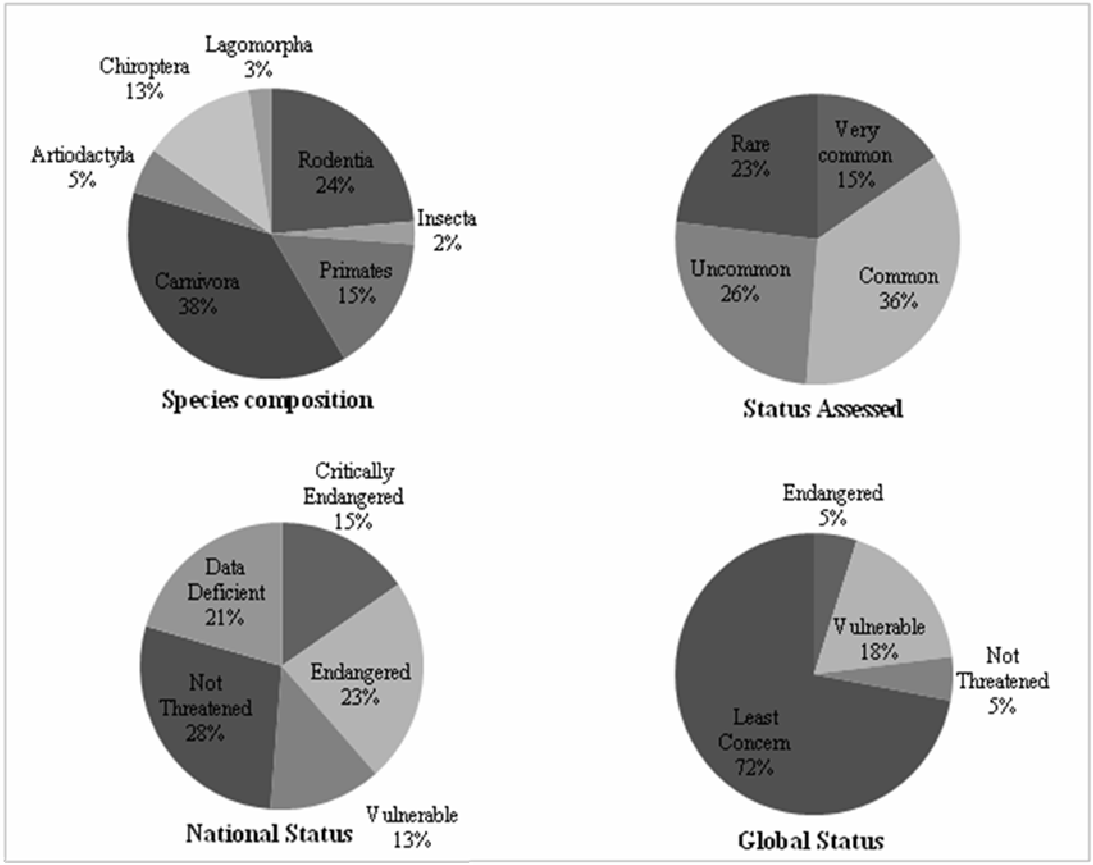

Fig. 2. Species composition and status of mammalian species in the LNP

Large scale wildlife poaching or hunting was non-existent in the park. However, respondents opined that the *Gallus gallus* and *Gracula religiosa*, *Muntiacus muntjak* and sometimes even primates were targeted for hunting by local communities. Study also noted that wildlife fauna such as monkeys, birds and squirrels were occasionally trapped and sold to local agent of poachers.

Currently, tourism activities in the LNP have immensely increased after the promotion of tourism through co-management approach under Nishorgo Support Program by the BFD since 2004. However, no effective rules and regulations have yet been in place for managing tourists and visitors' activities friendly to forest and wildlife therein. As a result, chasing wildlife, playing high volume music, leaving non-degradable wastes and creating chaos have become common place in the park nowadays.

DISCUSSION

The checklist presented is the first of its kind covering almost all of the major mammalian groups. However, the list is not exhaustive but to be considered as the baseline to integrate for better management of the park as well as for the mammals. Previous studies reported occurrence of some mammals, namely, 6-8 species of mammals mentioned by several workers (Leech and Ali 1997), 6 species of non-human primates by Feeroz (1999). However, Khan (1982) reported on the sighting of the *Panthera pardus* but this study did not find any such information to support its presence in the park.

Most of the viverrids were rare and uncommon as noted in this study. One reason behind this rarity might be their cryptic and nocturnal habits and thus occasional encounter to the respondents interviewed. Earlier study reported that this national park has been the home for one of the largest population of the *Hoolock hoolock* comprising of 42 individuals in 11 social groups (Islam *et al.* 2006). The *Macaca leonina, M. mulatta* and *Trachypithecus pileatus* were commonly observed while the *Trachypithecus phayrei* and *Nycticebus bengalensis* were uncommon and rare respectively (Aziz 2007, Aziz and Feeroz 2009a). A good number of social groups of the former three primate species were recorded while few groups and individuals were noted for the later two. All species of bats except the *Pteropus giganteus* have been found to roost within the houses of BFD staff and Khasia communities from where they had been netted (Aziz 2009). However, extensive and long-term study on chiropterans can raise this number in future. The *Callosciurus pygerythrus* and *Dremomys lokriah* were frequently found throughout the park while the *Petaurista magnificus* occasionally noticed in the areas of traditional betel leaf cultivation (Aziz and Feeroz 2009b). The park also supports a good number of *Sus scrofa* which have been known to become menace to nearby agricultural farms in addition to the *Hystrix indica* (Aziz and Feeroz 2007). Another artiodactyl, the *Muntiacus muntjak* has nearly undergone to extinction locally due to illegal hunting and poaching (Aziz 2007).

Unlimited demands of the growing human population living in and around the park have left the mammalian species and their forest habitats in peril. Despite having several initiatives in place by the BFD to abate dependency on forest resources for the last few years, such efforts, however, practically demonstrated very little tangible outcomes in the field. Illegal tree felling has been widespread in the LNP which is thought even quite large. Available reports suggest that annual illegal logging in 2005-2006 averaged to 1188 trees in Lawachara National Park alone (Muzaffar *et al.* 2011). Although, these occurrences are primarily attributed to inadequate staff, logistics and

equipment; however, greed and frail morale of the park officers and staff are also questionable in this regard (Feeroz and Islam 2000). These studies noted that the *Tectona grandis*, *Artocarpus chaplasha* and other large timber trees are being cut regularly. The *Artocarpus chaplasha* was regarded as one of the important fruit trees for primates, rodents and birds and removal of this tree is resulting in acute food scarcity in addition to canopy detachment and disruption. Betel leaf cultivation practices by the Khasia tribe have been thought to be affecting ecosystem integrity, particularly eroding soil and driving wildlife away from those areas. In addition, available reports suggest that people from 11 villages surrounding the park also collect substantial amount of NTFPs regularly (Feeroz and Islam 2000). Furthermore, the plantation practices carried out by the forest department have been thought to bring out adverse consequences to the forest ecosystem and integrity and thus the mammalian habitats.

The *Muntiacus muntjak*, *Sus scrofa* and *Macaca mulatta* usually become the prime targets for hunting and trapping in addition to *Gallus gallus* and *Gracula religiosa*. This study also found that some local people trapped wildlife species such as monkeys, birds and squirrels for selling to local agent of poachers; similar observations were also reported by CNRS (2000). Nevertheless, anecdotal reports and respondent's opinion suggest that some local people haunt for wildlife for a local zoo located at Sreemongal town which have also been proved by regular visits there.

Tourism activities are unmanaged and regulative mechanisms are non-existent in the LNP despite having eco-guides available for tourists for guided tourism. In addition, cattle grazing by the local and some inside people, fodder collection, hunting and other resource exploitation, gas exploration activities, etc. also noted as threats to wildlife and ecosystem integrity. Ahsan (2003) indentified the link of declining hoolock population with that of habitat destruction, tourism activities and gas exploration.

In conclusion, the checklist provided is not exhaustive and could be used as a baseline to contribute in future park management plan. Illegal poaching of trees are urgently required arresting forest/habitat loss and fragmentation to support long term conservation of mammals. In this connection, government's will, sufficient logistic and skilled, dedicated BFD staff, regulative and controlled tourism activities are strongly recommended.

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