GORALS (*NEMORHAEDUS GORAL HODGSONI*) IN MAHANANDA WILDLIFE SANCTUARY, WEST BENGAL, INDIA

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Geographically, Gorals are restricted to India, Pakistan, southern part of Siberia, southern Myanmar, China and Korea (Pocock, 1908; Corbet & Hill, 1991). Among the two races in India, *Nemorhaedus goral goral* (Hardwicke) is found in western Himalaya (Sinha, 1995; Sinha, 2000) and *N. g. hodgsoni* Pocock in eastern Himalaya (Inglis *et al.*, 1919; Agarwal *et al.*, 1992; Diwedi, 1997). Body colour of *N. g. hodgsoni* varies from yellowish-grey to rufous brown and is spotted with black. White patches are present on its upper lip, chin, throat and cheek. Body hairs form a conspicuous crest on the neck and a dorsal black stripe reaches to the tip of the tail. It attains a shoulder height of 65-70cm with a head and body length of 100-105cm. It has conical, backwardly directed horns marked with annular rings. This study attempted to determine the present status of the animal in this habitat. Goral is declared Vulnerable and is listed in Schedule I of the Indian Wildlife (Protection) Act (1972).

Mahananda Wildlife Sanctuary is situated in the eastern Himalayan region (26°47'54"-26°55'33"N; 88°23'36"-88°33'31"E) covering an area of 158.04km^2 (Fig. 1). The elevation ranges from 150-1300m. MWS is divided into 33 administrative compartments or blocks. Approximately 60% of the forests of this Sanctuary are on the hills. There are high mountain ridges in the north with steep and gentle slopes housing a rich flora. The southern side harbours the Terai belt and alluvial plains which are better connected by road and rail and have greater human activity. The densely forested ridges and precipitous slopes on the higher elevations are favourite sites for the gorals. The climate is temperate to tropical depending on the elevation. Annual rainfall is about 180-200cm, most of which precipitates from June to September. In the plains, there exists riverine and Sal (*Shorea robusta*) forests. Lower hill forests have mixed vegetation extending up to 800m, with species such as *Gmelina arborea*, *Lagerstroemia parviflora*, *Tetrameles nudiflora*, *Acrocarpus fraxinifolius*, *Duabanga sonneratioides*, *Ailanthus grandis*, *Cinnamomum* sp. and *Castanopsis* sp. Forests above 800m are composed of plants like *Taluma hodgsoni*, *Betula alnoides*, *Alnus nepalensis*, *Phoebe attenuata*, *Callophyllum sikkimense* etc. Plantation of *Cinchona succirubra* is also found in higher elevations.

The study aimed at recording the occurrence and distribution of gorals within the MWS. For each block, records were maintained as daily sightings along the transect. Records were also maintained on number of animals, elevation of the sighted spot and the perpendicular distance from the animal to transect line. The presence / absence of gorals in each block was assessed from direct sightings and indirect evidences (by enquiring local inhabitants, presence of faecal matter etc.). The survey was made on foot following forest trails as the animals prefer hilly terrain and are rarely sighted in the plains. A detailed questionnaire was also used to collect information on Goral from local people and forest staff .

Nearly nine blocks (A-I in Fig. 2) covering 4298.41ha were surveyed to confirm its occurrence during the winter of 2000-2001. Blocks were selected on the basis of earlier records, nature of elevation and habitat suitability. Among them, five blocks (2850ha) formed the distribution range of Goral in the MWS. A team of four members including the author as principal investigator, one assistant investigator, one tracker and a forest staff were involved in the survey. Block maps, compass, binoculars and camera were the common aids used during the field study. Early morning sightings were common. At a time, maximum three to four animals were sighted and in many cases a solitary member was often seen during the transect study. Their agility and alertness never allowed anyone to get close to the animal. The best time to watch these animals was between 0700 and 1030hrs and between 1600 and 1730hrs. In cloudy weather, they were found to take rest till late in the morning and sometimes do not even come out. They have an excellent skill of negotiating steep slopes and rocky cliffs. Hence there is no natural barrier for their movement.

The habitat of their preference has kept them away from direct interaction with human beings. In fact, animal to observer distance in this study was between 250 and 400ft. There is extensive human activity in some parts of the sanctuary, however, that did not affect the gorals much because of their preference for higher elevations. Varieties of plants were recorded from their habitat among which one fodder species (*Polygonum chinensis*) has been recognised so far from the study location. Gorals eat the tender apical leaves and shoots of this plant. There is a possibility of a total of 35-50 individuals inside the sanctuary, but it is not confirmed whether they are permanent residents or seasonal migrants. Mana Block, located northwest to the sanctuary provides similar habitat for the gorals and can be a transit route for movement of the animals to and from the sanctuary.

Transmission of disease in wild population from the domestic

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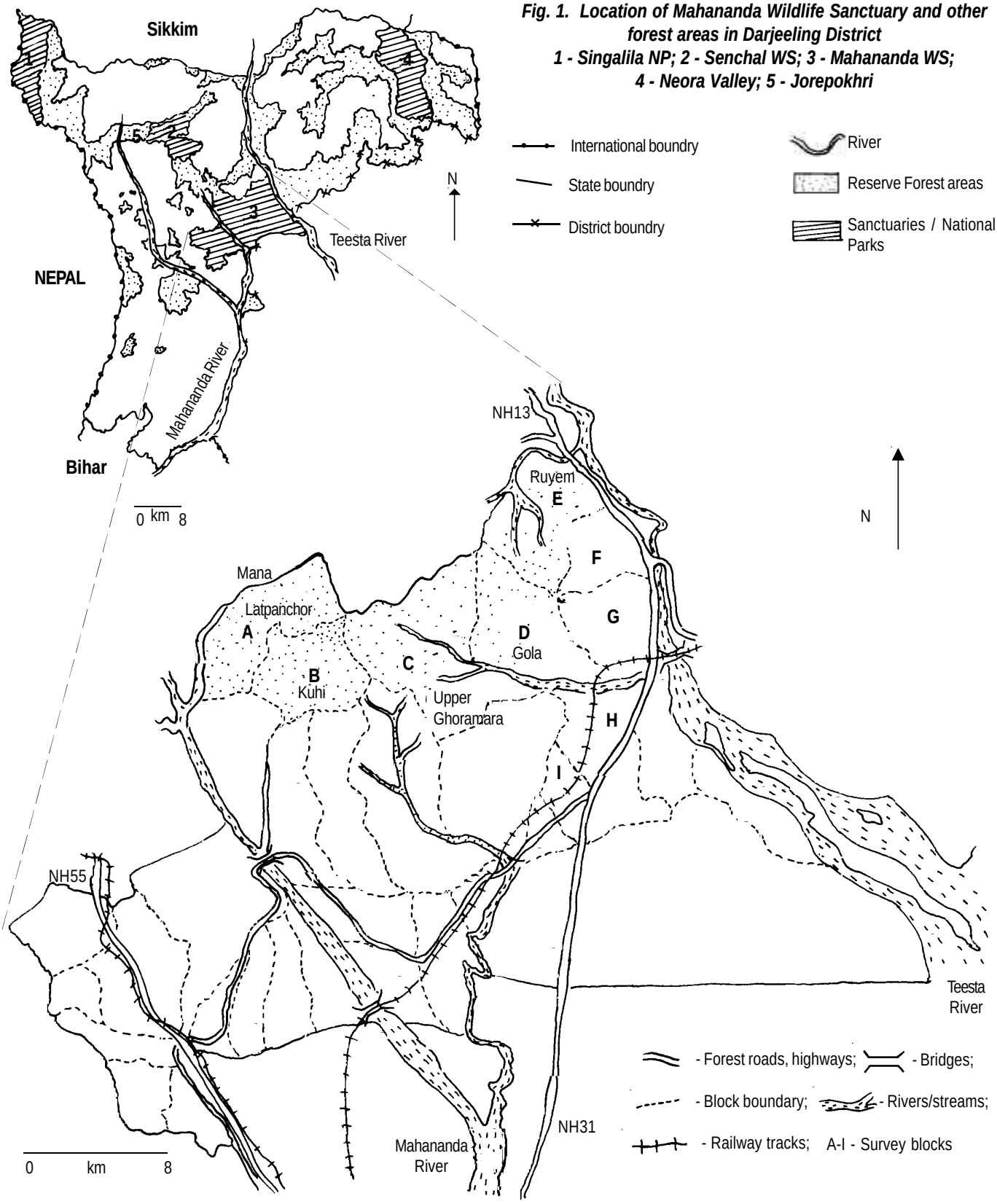

Fig. 1. Location of Mahananda Wildlife Sanctuary and other forest areas in Darjeeling District
1 - Singalila NP; 2 - Senchal WS; 3 - Mahananda WS; 4 - Neora Valley; 5 - Jorepokhri

Fig. 2. Distribution range of Goral in Mahananda Wildlife Sanctuary

Table 1. Localities from where Gorals have been recorded

Area/ Division / Block	Location	Animals seen or recorded	Approximate elevation (feet)	Period of observation
Upper Ghoramara	Tincholey *	2 live	2500-3000	Dec-Jan 1996
Kuhi	Kuhi *	3-4 live	3500-3800	Jan-Feb 2001
Kurseong Div.	Mana	1 dead	>3000	Dec-Feb 1996
Gorumara	—	1 live	<50	Dec-Jan 2001
North Sikkim	Namphikdang	1 live	>9000	May-July 2001

* Locations inside Mahananda Wildlife Sanctuary

stock is rare as the inhabitants do not allow grazing and maintain their livestock in captivity. Different mammals like *Elephas maximus*, *Sus scrofa*, *Cervus unicolor*, *Muntiacus muntjack*, *Panthera pardus*, *Panthera tigris*, *Macaca assamensis* and *Hemitragus jemlahicus* share this habitat with gorals. Nearly 35 mammals and 280 birds have already been recorded from the MWS.

Gorals generally prefer altitudes ranging from 3048-4876m, depending on the habitat and availability of forage (Ghosh, 1981). They generally migrate to lower valleys as low as 900m with the onset of winter. Majority of the observations inside MWS was above this level but below the altitude of 1500m. They were sighted at much higher elevations in the two other protected areas of this district. Hence this habitat can be considered as the lowermost limit of their winter migration. Based on the observations and records so far in MWS, they are sighted more frequently during winter. From the data obtained, the chances of a permanent resident population of gorals living inside the sanctuary is very less.

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