

THREAT TO INDIA'S MANAS TIGER RESERVE

by Asad R. Rahmani, Goutam Narayan and Lima Rosalind

Manas Tiger Reserve in Assam State of north-east India is one of the largest protected areas in India. It was also one of the first reserves to be included in the network of tiger reserves when the Project Tiger was launched in 1973 by the Government of India to protect the dwindling numbers of tigers. In 1988, Manas was designated as a site of international importance under Unesco's World Heritage Convention. Agitation by tribals around the reserve and the resultant disturbed conditions are posing a grave threat to this sanctuary. This paper briefly describes the wildlife of Manas and the recent threats to this sanctuary.

Location

The 2837 sq. km. Manas Tiger Reserve falls in Barpeta, Kokrajhar, Kamrup, Darrang and Nalbari districts of Assam. Within the reserve is the 391 sq. km. Manas Wildlife Sanctuary (WS) which serves as the core area. There is no human habitation in the core area, except for forest department camps and offices. However, in the buffer zone which includes rest of the reserve, there are numerous forest villages which are mainly inhabited by Bodo tribals, Nepali graziers, and Bengali and Assamese agriculturists. The southern boundary of the reserve adjoins agricultural fields and a tea estate; therefore, there is some human disturbance. But the northern boundary adjoins the lush green forests of the Bhutan hills and is virtually undisturbed. The Government of Bhutan has also declared a wildlife sanctuary on its side, thus nearly 3.300 sq. km. of contiguous forest is protected in the two countries. Manas river flows southward from Bhutan to India after descending from the Himalayas. The altitude of Manas WS varies from 50 to 200 metres. Bornadi is a small sanctuary of 26 sq. km. in Darrang district on the eastern end of the tiger reserve.

Climate

The climate of Manas is moist tropical and the annual rainfall is around 4000 mm, most of it falling between June and September, although rain usually starts in March and continues up to October. In summer, the maximum temperature can go up to 36°C, while in winter the temperature can go down to 5°C.

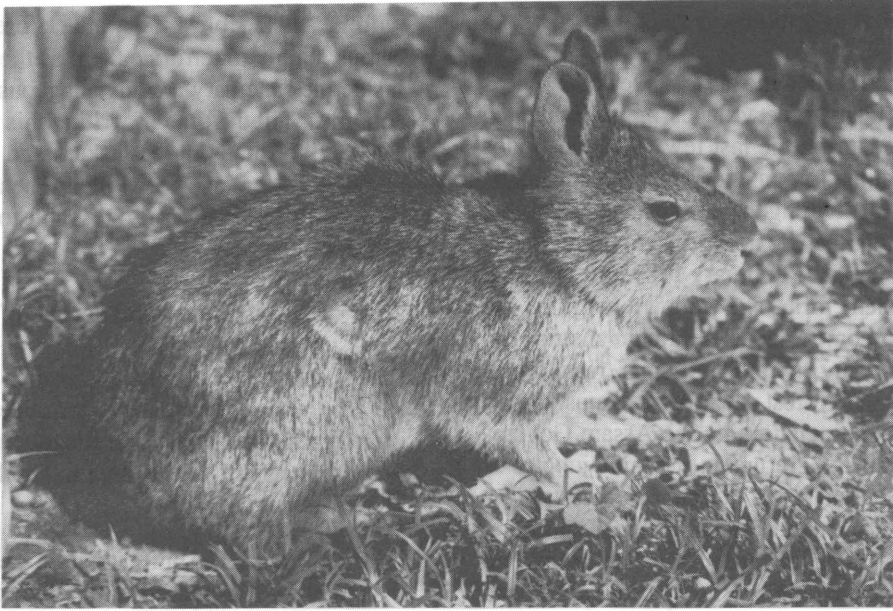
Vegetation and Terrain

The vegetation of Manas is basically wet alluvial grasslands, with patches of *Dillenia* swamp forests, semi-evergreen forests and riparian fringe forests (Jain and Hajra, 1975). Nearly 45 percent of the Manas WS is under grasslands which harbour some of the most endangered species of wildlife of India such as the hispid hare, pygmy hog, Bengal florican and the Indian rhinoceros. The northern part of the sanctuary which adjoins Bhutan is covered with moist mixed deciduous and tropical semi-evergreen forests. The terrain is mostly flat, gently sloping to the south with a number of rivers draining from north to south. The most important river is Manas, after which the sanctuary is known. It originates from the Himalayas in Bhutan and joins the mighty Brahmaputra river which flows about 50 km. south of the reserve.

Wildlife

Manas harbours the largest number of protected species of India. More than 40 species listed in Schedule I of the Indian Wildlife (Protection) Act 1972 are found in Manas. For many species such as hispid hare, pygmy hog, wild buffalo and Bengal florican, the wildlife sanctuary is the last stronghold. With its high rainfall, Manas has luxuriant plant growth which provides ecological niches to an innumerable number of invertebrates, fish, amphibians, reptiles, birds and mammals. Nearly 300 species of birds have been identified from the sanctuary (S. Deb Roy, pers. comm.). Within our study area near Basbari we noted 270 avian species.

One of the rarest birds present is the Bengal florican which we studied between 1985 and 1989. Of the 22 species of bustards in the world, the Bengal florican is the most endangered. It is listed in the **Red Data Book** of the IUCN. Out of a world population of 400 Bengal floricans, we think that 80 are present in Manas. (Rahmani et al, in press). Till the middle of this century, the Bengal florican was a fairly common bird in the grasslands of the Himalayan foothills and the Assam Valley, with a range extending up to Bangladesh (Ali and Ripley, 1970). It is now extinct in Bangladesh (Karim, 1985) and extremely rare all over its range. It



Manas is one of the last strongholds of the Hispid Hare. (Photo: Goutam Narayan)

survives wherever its grassland habitat is present like in Dudwa, Manas, Kaziranga, Orang, Pabitara and Jaldapara wildlife sanctuaries in India (Rahmani *et al*, 1988) and Chitwan, Sukla Phanta, Royal Bardia and Kosi Tappu in Nepal (Inskipp and Inskipp, 1985).

The hispid hare and the pygmy hog are two other habitat-specific species whose survival is interlinked with the alluvial grasslands. These animals were considered extinct till their rediscovery in March 1971 in Bornadi and Manas (Mallinson, 1971; Oliver, 1978). Bornadi was specially created to give protection to hispid hare and pygmy hog. In recent years, hispid hare has been sighted in some more sanctuaries like Chitwan National Park in Nepal (Inskipp and Collars, 1984) and Dudwa National Park in north Uttar Pradesh (S.P. Sinha and Q. Qurieshi, 1989, pers. comm.). Oliver's surveys (1978, 1984) show that Manas appears to be the major stronghold of this elusive species.

Wild buffalo is another endangered species for which Manas is crucial for survival. Although small herds are present in some other sanctuaries like Indravati, Bhairamgarh, Pamed and Uddanti in Madhya Pradesh (Divekar and Bhushan, 1988) and Kaziranga and Laokhowa in Assam, the largest population is seen in Manas. This species was associated with the large rivers and their tributaries in the Gangetic plains of north India, the Brahmaputra flood plains of northeast India, and riverine jungles of eastern peninsular India (Daniel and Grudh, 1966), but with the destruction of habitat and unrestricted shooting, the wild buffalo now sur-

vives only in a few protected pockets.

Like the wild buffalo, the great one-horned rhinoceros was also an inhabitant of the wet alluvial grasslands of the flood plains of larger Indian rivers. Hunting and habitat destruction have made them extremely rare and now the rhino survives in some protected areas of India and Nepal. Out of the estimated 1,700 rhinos (Sale and Singh, 1987), nearly 100 are found in Manas. Swamp deer is another endangered species seen in Manas. Our population estimate is between 80 to 100 animals (better populations are present in Kaziranga and Dudwa in India and Sukla Phanta in Nepal).

Reptiles are among the lesser known animals of Manas. In addition to the Yellow Monitor Lizard and the King Cobra, which comes under the endangered category, Manas also harbours a variety of turtles and terrapins. The Assam Roof Turtle was recently found there (Sharma, 1988) which is a range extension for this extremely rare species. Other rare turtles are the Eastern Hills Terrapin and the Sawbacked Terrapin. Very little information is available about the status and biology of these turtles (Daniel, 1984).

Threats to Manas

In spite of Manas being a tiger reserve and its core area a wildlife sanctuary, there are many threats to this important protected area of India. Following are the major threats faced by Manas:

1. Bodo tribal agitation

As reported earlier, the buffer zone of the Manas tiger reserve has many forest villages, mainly inhabited by Bodo tribals. During the last few years the Bodos have been agitating for an independent state to be carved for them by dividing the present state of Assam, despite the fact that they do not form a majority in any district of the state. Since February 1989, this agitation has taken a violent turn. The Panbari range of the sanctuary which comes under Kokrajhar district has been fully occupied by the Bodo militants, resulting in complete desertion of forest department camps. With a crackdown on Bodo agitators by the Assam Government, the militants took refuge in the thick jungles of Manas and raided and burnt the interior forest guard camps. Lafasari camp under Panbari range, Kapurpora, Bhalaguri and Chonglapani under Bansbari range, and Makhibaha beat office under Bhuyanpara range have been burnt down. There is continuous pressure on the last two range offices and armed attacks have been repulsed at Kahitama beat office of Bansbari range. This created so much fear among the ill-equipped wildlife guards that most of the camps were abandoned. This has seriously affected the protection and management of the sanctuary. The Bornadi WS is also facing similar problems as it lies in another tribal belt.

Opportunistic poachers and timber smugglers who may not be tribals at all are taking advantage of the disturbed situation and causing most of the damage to

wildlife and the forest. They attack forest staff and their camps mainly to terrorize them as the deserted camps inside the sanctuary are advantageous for their covert activities. Till the time of writing this paper (February 1990), five rhinos, three tuskers and an innumerable number of deer have been killed. The unofficial record must be higher because no one is able to go in some parts of the sanctuary.

2. Encroachment and spread of cultivation

A large part of the buffer area under the Tiger Reserve on the eastern and western sides of the core area is under encroachment and illegal cultivation. Whatever forest is left in this area is highly degraded and disturbed.

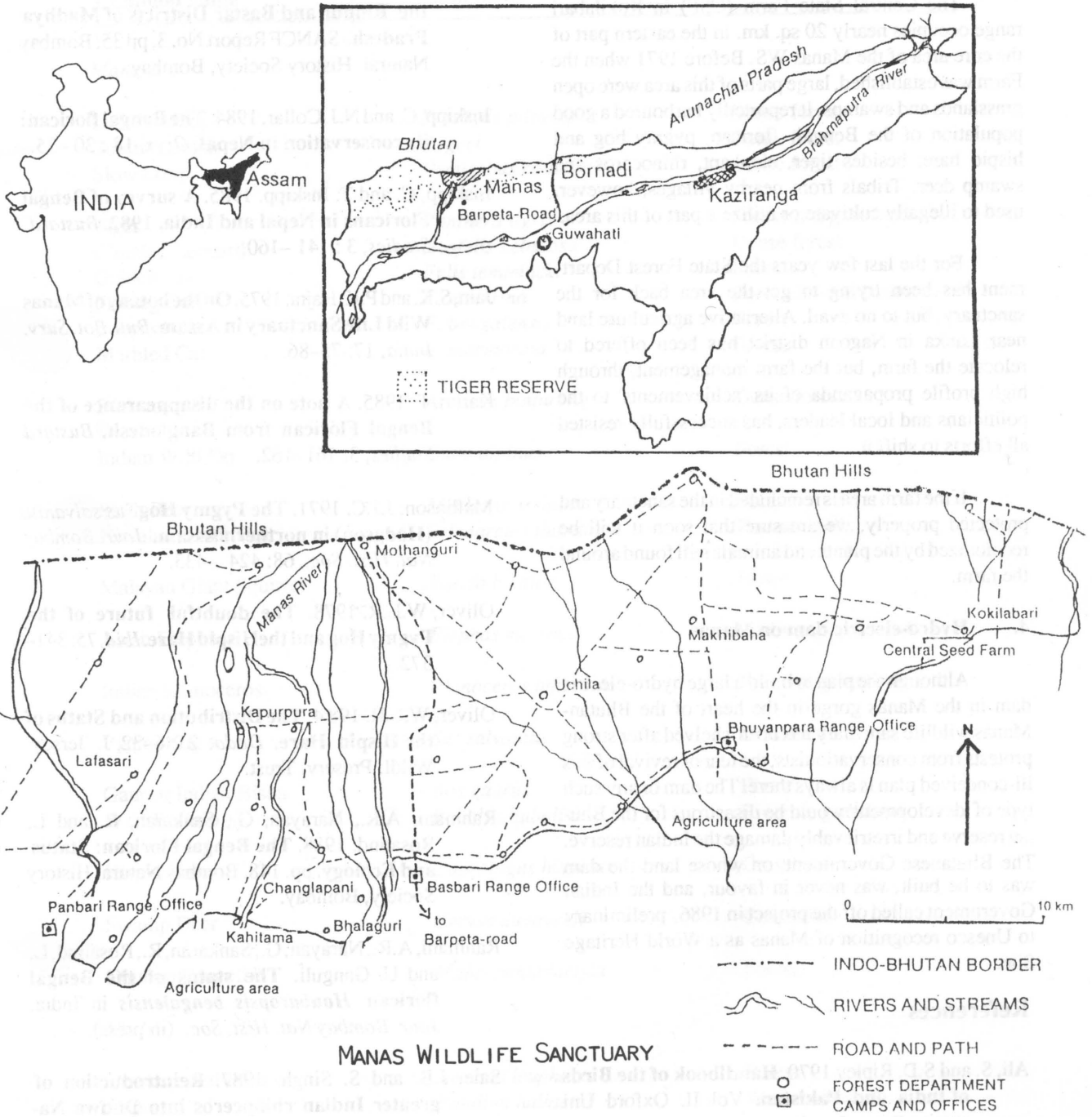
As there is no buffer zone on the southern side of the Manas WS, increased cultivation and settlement are putting more pressure on the core area. Even before the tribal agitation began, some of the areas under the Panbari range were affected by overgrazing by cattle and disturbance from locals collecting minor forest products. Poaching of wildlife was not uncommon.

All this is evident from increasing man-animal conflict as the long-ranging animals like elephant, gaur, wild buffalo and tiger frequently come in contact with humans and their livestock. Raiding of crop fields by elephants or hog deer is becoming more and more common, thus creating unnecessary ill-feeling among



With breakdown in law and order, rhino poaching in Manas has increased. Here, wildlife authorities are inspecting a poached rhino from which the horn has been removed by poachers. (Photo: Goutam Narayan)

Manas tiger reserve and core area in Assam state of India



MANAS WILDLIFE SANCTUARY

the cultivators who want to get rid of the sanctuary and its wildlife.

3. Central State Farm

The Central State Farm (CSF) in Kokilabari range occupies nearly 20 sq. km. in the eastern part of the core area of the Manas WS. Before 1971 when the Farm was established, large parts of this area were open grasslands and swamps. It reportedly harboured a good population of the Bengal florican, pygmy hog and hispid hare, besides tiger, elephant, rhinoceros and swamp deer. Tribals from nearby villages, however, used to illegally cultivate or utilize a part of this area.

For the last few years the State Forest Department has been trying to get the area back for the sanctuary, but to no avail. Alternative agriculture land near Lanka in Nagoan district has been offered to relocate the farm, but the farm management, through high profile propaganda of its 'achievements' to the politicians and local leaders, has successfully resisted all efforts to shift it.

If the farm area is reincluded in the sanctuary and protected properly, we are sure that soon it will be recolonized by the plants and animals still found around the farm.

4. Hydro-electric dam on Manas

Although the plan to build a large hydro-electric dam in the Manas gorge in the heart of the Bhutan-Manas wildlife sanctuary has been shelved after strong protests from conservationists, the fear of revival of this ill-conceived plan is always there. The dam or any such type of 'development' would be disastrous for the Bhutan reserve and irretrievably damage the Indian reserve. The Bhutanese Government, on whose land the dam was to be built, was never in favour, and the Indian Government called off the project in 1986, preliminary to Unesco recognition of Manas as a World Heritage Site.

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Protected species* found in Manas

Common name	Latin name	Preferred habitat
<i>Mammals</i>		
Leaf Monkey	<i>Presbytis pileatus</i>	Dense forest
Golden Langur	<i>P. geei</i>	Dense forest
Slow Loris	<i>Nycticebus coucang</i>	Dense forest
Tiger	<i>Panthera tigris</i>	Forest and grassland
Clouded Leopard	<i>Neofelis nebulosa</i>	Dense forest
Golden Cat	<i>Felis temmincki</i>	Forest
Fishing Cat	<i>F. viverrina</i>	Forested waterbodies
Leopard Cat	<i>F. bengalensis</i>	Forest
Marbled Cat	<i>F. marmorata</i>	Forest
Binturong	<i>Arctictis binturong</i>	Dense forest
Indian Wild Dog	<i>Cuon alpinus</i>	Forest
Sloth Bear	<i>Melursus ursinus</i>	Forest
Himalan Black Bear	<i>Selenarctos thibetanus</i>	Forested hills
Malayan Giant Squirrel	<i>Ratufa bicolor</i>	Forest
Asian Elephant	<i>Elephas maximus</i>	Forest and grassland
Indian Rhinoceros	<i>Rhinoceros unicornis</i>	Riverine grassland
PygmyHog +	<i>Sus salvanius</i>	Grassland
Gaur or Indian Bison	<i>Bos gaurus</i>	Forest
Wild Buffalo +	<i>Bubalus bubalis</i>	Riverine grassland
Hispid Hare +	<i>Caprolagus hispidus</i>	Grassland
Swamp Deer	<i>Cervus duvauceli</i>	Grassland
Chinese Pangolin	<i>Manis pentadactyla</i>	Forest
<i>Birds</i>		
Blackcrested Baza	<i>Aviceda leuphotes</i>	Forest
Osprey	<i>Pandion haliaetus</i>	Waterbodies
Swamp Partridge	<i>Francolinus gularis</i>	Grassland
Peafowl	<i>Pavo cristatus</i>	Forest and grassland
Bengal Florican +	<i>Houbaropsis bengalensis</i>	Grassland

Common name	Latin name	Preferred habitat
Great Pied Hornbill	<i>Buceros bicornis</i>	Forest
Indian Pied Hornbill	<i>Anthracoceros malabaricus</i>	Forest
Wreathed Hornbill	<i>Rhyticeros undulatus</i>	Fores
<i>Reptiles</i>		
Gharial **	<i>Gavialis gangeticus</i>	Rivers
Indian Pond Terrapin	<i>Melanocheelys trijuga</i>	Waterbody
Eastern Hill Terrapin	<i>M. tricarinata</i>	Terrestrial
Sawbacked Terrapin	<i>Kachuga tecta</i>	Waterbody
Chapant Terrapin	<i>K. smithi</i>	Terrestrial
Assam Roof Turtle	<i>K. sylhetensis</i>	Waterbody
Flapshell Turtle	<i>Lissemys punctata</i>	Waterbody
Chitra Turtle	<i>Chitra indica</i>	River
Malayan Box Turtle	<i>Cuora amboinensis</i>	Terrestrial
Water Monitor	<i>Varanus salvator</i>	Semi-aquatic
Yellow Monitor	<i>V. flavescens</i>	Terrestrial
King Cobra	<i>Ophiophagus hannah</i>	Forest

* Listed in Schedule I of the Indian Wildlife (Protection) Act

** Possibly extinct in Manas

+ Manas critically important

PROTECTED AREA MANAGEMENT : A CASE STUDY OF PROJECT TIGER SCHEME OF INDIA

by R.L. Singh

The identification and preservation of protected areas as living store-houses of the biological diversity found in the region has always been considered a desirable land use in all the countries of the world. A study of the nature conservation history of any country will reveal that centuries ago, there lived great men and women who could visualize the role of different life forms in the well being of the human race. The location, size, management objectives and degree of protection accorded to these protected areas, however, kept on changing with the increasing knowledge of the impact of human activities on the environment, flora and fauna.

In India, as early as 321 B.C. the Kautilya in his book 'Arthashastra' specified the need for establishing areas called 'Abhyaranya', defined as, "areas where beasts roam about without any fear of man". With the passage of time, a large number of game reserves, wildlife sanctuaries, and national parks were established in India.

The modern era of nature conservation in India may be considered to have started in 1952 with the constitution of the Indian Board for Wildlife (IBWL). This apex body, headed by the Prime Minister of India