

Mammals, birds and reptiles of Dibru-Saikhowa Sanctuary, Assam, India

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Dibru-Saikhowa Sanctuary protects 340 sq km of the floodplains of the Brahmaputra and Lohit rivers in eastern Assam state, north-eastern India. It provides habitat for several threatened species, including Asian elephant and tiger. The sanctuary suffers from several problems, however, including illegal tree felling, the scarcity of safe, high ground for animals during the annual floods and insufficient staff and resources. The author makes recommendations for improving the conservation value of the sanctuary.

Introduction

Dibru-Saikhowa Wildlife Sanctuary (DSS) is located in the extreme east of Assam state, north-eastern India (27°35'–27°47'N, 95°10'–95°40'E). It covers part of two districts, Tinsukia and Dibrugarh, on the floodplains of the Brahmaputra and the Lohit rivers (Figure 1). The sanctuary was designated in 1986 and was to cover an area of 640 sq km but, when it was finally notified in 1995, the river beds of the Lohit and Brahmaputra rivers, and the Amarapur area were excluded, reducing its area to 340 sq km. The DSS was once a large tract of tropical rain forest but during the earthquakes of 1950 a large part of the sanctuary sank by a few metres, resulting in regular flooding. The natural vegetation gradually changed and now the woodland is a tropical deciduous type (Choudhury, 1994b). Some of the largest *Salix* swamps remaining in north-eastern India are found in the sanctuary. Characteristic species include *Salix tetrasperma*, *Bischofia javanica*, *Dillenia indica*, *Terminalia myriocarpa* and *Lagerstroemia flos-reginae*. The grassland and reedbeds are covered by tall grass species, such as *Arundo donax*, *Phragmites karka*, *Erianthus ravennae*, *Imperata cylindrica* *Saccharum spontaneum* and *S. arundinaceum*. The area has a tropical monsoon climate and the annual rainfall is 2300–3800 mm.

The DSS provides habitat for Asian elephant*, tiger, Asiatic water buffalo (Choudhury,

1994a) as well as waterfowl, and is among the last strongholds of the white-winged wood duck, one of the rarest ducks in the world (Choudhury, 1996a). The adjacent forest pockets of Bherjan and Podumoni are very good areas for primates (Choudhury, 1995).

The primary objective of this study was to collect data on the presence and diversity of mammals, birds and reptiles (especially turtles and monitor lizards) in the DSS as well as adjacent areas including the Bherjan (1 sq km) and Podumoni (1.7 sq km) Reserved Forests.

Methods

The surveys were conducted between July 1992 and May 1994, with short visits in 1995 and 1996. I surveyed the sanctuary using a small wooden boat (especially during the monsoon), on foot (especially during the dry winters), by motor-boat (on the Lohit River and once from Guijan to Burhibeel), using the transect method along existing forest trails, channels and rivers. All sightings and indirect evidence (pugmarks, tracks, faeces) were recorded. I also interviewed forest officials including guards, fishermen, hunters and graziers, especially about the conspicuous species that are easy to identify. In Bherjan and

* Scientific names of mammals, birds and reptiles mentioned in the text are given in Tables 1, 2 and 3.

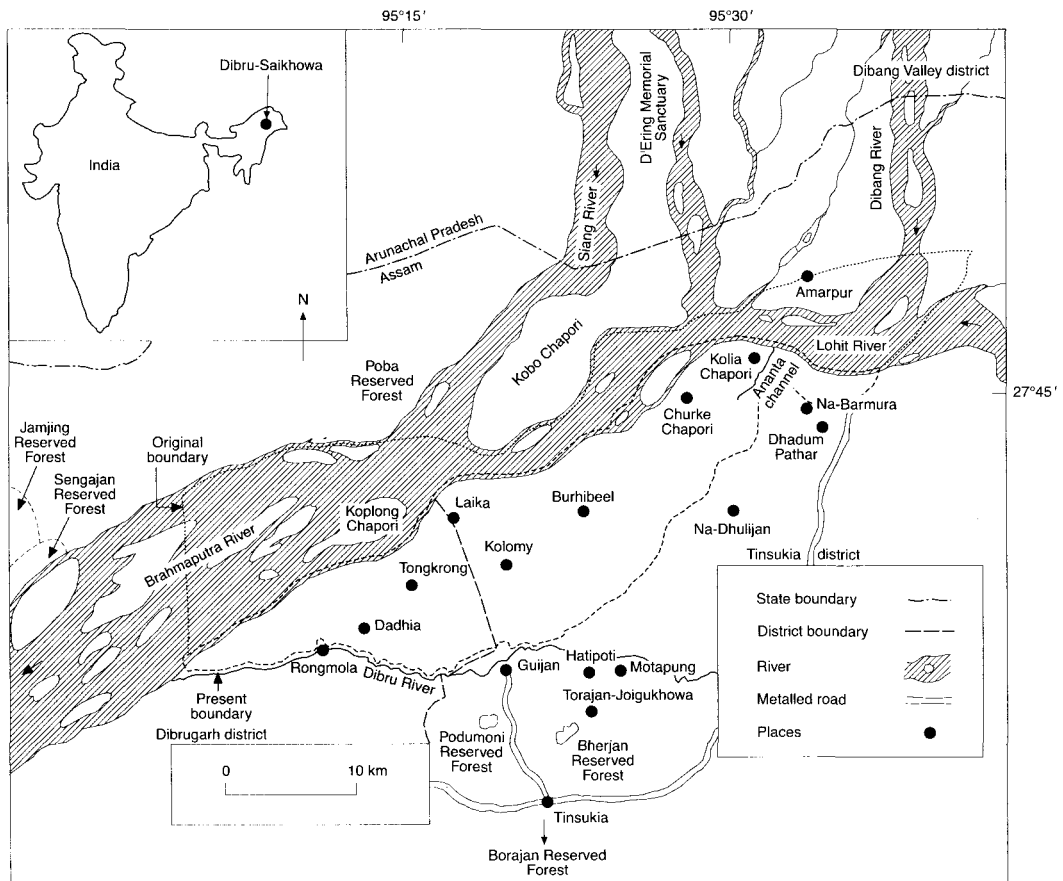


Figure 1. Dibru-Saikhowa Sanctuary, Assam, India.

Podumoni Reserved Forests, I carried out foot-transects along existing trails and roads. Daily records were made of observations or signs of all birds, mammals and reptiles.

In total, I spent 620 h spread over 78 days in the DSS and adjacent areas, and 311 h (71 days) and 28 h (13 days), respectively, in Bherjan and Podumoni Reserved Forests. The locations of the transects are shown in Figure 1. As a result of the long survey period, it was possible to record most of the larger species through direct sightings.

Results

I recorded the presence of 35 species of mammals (Table 1), while there were more species, such as bats and rodents, that could not be

identified. To date 313 species of birds have been confirmed and some of the more notable of these are listed in Table 2. In the case of reptiles I could verify only 18 species (Table 3).

Asian elephant

I encountered Asian elephants throughout the area. They are among the most familiar mammals of the DSS and are unlikely to be missed by any visitor. Based on personal sightings, and interviews with forest officials and ex-mahouts, I estimated a fluctuating population of 150–400. A census carried out by the Forest Department in March 1993 using a direct count method found 131 elephants. Elephants regularly move out of the sanctuary, crossing the Brahmaputra and Lohit rivers to Kobo Chapori (*chapor* = riverine island in the local

Table 1. Mammal species identified in Dibru-Saikhowa Sanctuary (DSS) and adjacent areas

English name	Scientific name	Method of identification	Status in DSS§
Mole-shrew, Szechuan burrowing shrew*	<i>Anourosorex squamipes</i>	Visual	Rare
Indian flying fox	<i>Pteropus giganteus</i>	Visual	Common
Slow loris	<i>Nycticebus coucang</i>	Past capture record	Rare
Pig-tailed macaque	<i>Macaca nemestrina</i>	Visual	Rare†
Rhesus macaque	<i>Macaca mulatta</i>	Visual	Common
Assamese macaque	<i>Macaca assamensis</i>	Visual	Rare†
Capped langur	<i>Presbytis pileatus</i>	Visual	Rare
Hoolock gibbon	<i>Hoolock gibbon</i>	Visual	Rare
Chinese pangolin	<i>Manis pentadactyla</i>	Local report	Rare
Golden(-backed) jackal	<i>Canis aureus</i>	Visual/calls	Common
Dhole, wild dog	<i>Coua alpinus</i>	Local report	Very rare
Sloth bear	<i>Ursus ursinus</i>	Local report/tracks	Very rare
Unidentified otter	<i>Lutra/Lutrogale</i> sp.	Tracks	Common
Small Asian mongoose	<i>Herpestes javanicus</i>	Visual	Very common
Unidentified small cats	<i>Felis</i> spp.	Tracks	Unknown
Jungle cat	<i>Felis chaus</i>	Local report	Common
Leopard cat	<i>Felis bengalensis</i>	Local report	Common
Clouded leopard	<i>Neofelis nebulosa</i>	Visual (by N. Sharma)	Very rare
Tiger	<i>Panthera tigris</i>	Tracks	Common
Leopard	<i>Panthera pardus</i>	Visual, tracks, calls	Very rare
Asian elephant	<i>Elephas maximus</i>	Visual/tracks/faeces/calls	Common
Indian rhinoceros	<i>Rhinoceros unicornis</i>	Stray record in 1970s	Stray
Feral horse	<i>Equus caballus</i>	Visual	Rare
Wild pig	<i>Sus scrofa</i>	Visual/tracks	Common
Indian muntjac	<i>Muntiacus muntjak</i>	Tracks/preserved antlers	Common
Hog deer	<i>Axis porcinus</i>	Visual/tracks	Common
Sambar	<i>Cervus unicolor</i>	Tracks/preserved antlers	Rare
Gaur‡	<i>Bos gaurus</i>	Tracks/local report	Very rare
Wild water buffalo	<i>Bubalus arnee/bubalis</i>	Visual/tracks	Common
Indian hare (rufous-tailed race)	<i>Lepus nigricollis ruficaudatus</i>	Visual/tracks	Common
Common giant flying squirrel red flying squirrel	<i>Petaurista petaurista</i>	Local report (visual outside study area)	Common
Particoloured flying squirrel	<i>Hylomys alboniger</i>	Local report (visual outside study area)	Not known
Pallas's squirrel	<i>Callosciurus erythraeus</i>	Visual	Common
Irrawaddy squirrel Himalayan hoary-bellied squirrel	<i>Callosciurus pygerythrus</i>	Visual	Common
Malayan giant squirrel	<i>Ratufa bicolor</i>	Visual	Common
Crestless Himalayan porcupine Chinese porcupine	<i>Hystrix brachyura/hodgsoni</i>	Local report/tracks	Common
Gangetic dolphin	<i>Platanista gangetica</i>	Visual	Rare

* One dead specimen examined in Podumoni Reserved Forest.

† Rare in the DSS itself but common in Podumoni and Bherjan Reserved Forests.

‡ Seasonally only in the Amarapur area north of the Lohit river.

§ Estimates of status are based on both primary sources (direct observations, signs and preserved specimens) and secondary sources (reports from forest staff, villagers and others).

Table 2. Notable bird species, including those that are rare or endangered, identified in Dibru-Saikhowa Sanctuary and adjacent areas

English name	Scientific name	Method of identification	Status in study area†	Global status
Spot-billed pelican	<i>Pelecanus philippensis</i>	Visual	Rare	T
Oriental darter	<i>Anhinga melanogaster</i>	Visual	Common	N
White-bellied heron	<i>Ardea insignis / imperialis</i>	Visual (only once)	Rare	T
Malayan night heron, tiger bittern	<i>Gorsachius melanolophus</i>	Visual	Rare	–
Asian openbill stork	<i>Anastomus oscitans</i>	Visual	Common	N
Black stork	<i>Ciconia nigra</i>	Visual	Common, winter	–
Black-necked stork	<i>Ephippiorhynchus asiaticus</i>	Visual	Rare	–
Greater adjutant stork	<i>Leptoptilos dubius</i>	Visual	Rare	T
Lesser adjutant stork	<i>Leptoptilos javanicus</i>	Visual	Common	T
Glossy ibis	<i>Plegadis falcinellus</i>	Visual	Rare	–
Bar-headed goose	<i>Anser indicus</i>	Visual	Rare, winter	–
Fulvous tree duck, large whistling teal	<i>Dendrocygna bicolor</i>	Visual	Rare	–
Ferruginous pochard	<i>Aythya nyroca</i>	Visual	Rare, winter	T
Baer's pochard	<i>Aythya baeri</i>	Visual	Rare, winter	T
White-winged wood duck	<i>Cairina scutulata</i>	Visual/local report	Rare	T
Black baza	<i>Aviceda leuphotes</i>	Visual	Rare	–
Greater spotted eagle	<i>Aquila clanga</i>	Visual	Rare	T
Pallas's fish eagle, Pallas's sea eagle	<i>Haliaeetus leucoryphus</i>	Visual	Rare	T
Lesser fish eagle, Himalayan grey-headed fish eagle	<i>Ichthyophaga humilis</i>	Visual	Rare (only once)	N
Grey-headed fish eagle	<i>Ichthyophaga ichthyaetus</i>	Visual	Common	N
Cinereous vulture	<i>Aegypius monachus</i>	Visual	Rare, winter	N
Himalayan griffon vulture	<i>Gyps himalayensis</i>	Visual	Rare, winter	–
Swamp partridge, swamp francolin	<i>Francolinus gularis</i>	Calls	Rare	T
Kaliej pheasant	<i>Lophura leucomelanos</i>	Visual / feathers	Common	–
Red junglefowl	<i>Gallus gallus</i>	Calls	Common	–
Common crane	<i>Grus grus</i>	Visual	Rare, W	–
Sarus crane	<i>Grus antigone</i>	Visual	Very rare	N
Bengal florican*	<i>Eupodotis bengalensis</i>	Visual/local reports	Very rare	T
Black-bellied tern	<i>Sterna acuticauda</i>	Visual	Rare	T
Pale-capped pigeon, purple wood pigeon	<i>Columba punicea</i>	Visual	Rare	T
Brown fish-owl	<i>Ketupa zeylonensis</i>	Visual	Rare	–
Red-headed trogon	<i>Harpactes erythrocephalus</i>	Visual	Rare	–
Blyth's kingfisher	<i>Alcedo hercules</i>	Visual	Rare	T
Ruddy kingfisher	<i>Halcyon coromanda</i>	Visual	Rare	–
Indian pied hornbill	<i>Anthraceros albirostris / malabaricus</i>	Visual / calls	Common	–
Great pied hornbill	<i>Buceros bicornis</i>	Local report	Very rare	–
Black-breasted parrotbill*	<i>Paradoxornis flavirostris</i>	Visual	Very rare	T
Jerdon's bushchat	<i>Saxicola jerdoni</i>	Visual	Rare	N

* Sighted in the Amarapur area.

T, Threatened (Collar *et al.*, 1994).

N, Near Threatened (Collar *et al.*, 1994).

† Estimates of status in the study area are based on both primary sources (direct observations, signs and preserved specimens) and secondary sources (reports from forest staff, villagers and others).

Table 3. Reptile species identified in Dibru-Saikhowa Sanctuary and adjacent areas

English name	Scientific name	Method of identification	Status in study area*
Gharial	<i>Gavialis gangeticus</i>	Local report	Very rare
Malayan box turtle	<i>Cuora amboinensis</i>	Visual (live specimen)	Common
Asian leaf turtle	<i>Cyclemys dentata</i>	Visual (preserved shell)	Uncommon
Spotted pond turtle	<i>Geoclemys hamiltonii</i>	Visual (Preserved shell)	Uncommon
Brown roofed turtle	<i>Kachuga smithii</i>	Visual (live specimen)	Uncommon
Assam roofed turtle	<i>Kachuga sylhetensis</i>	Visual (live specimen)	Uncommon
Tent turtle	<i>Kachuga tentoria</i>	Visual (live specimen)	Common
Gangetic softshell	<i>Aspideretes gangeticus</i>	Visual (live specimen)	Common
Peacock softshell	<i>Aspideretes hurum</i>	Visual (live specimen from outside study area)	Uncommon
Narrow-headed softshell	<i>Chitra indica</i>	Visual (live specimen)	Uncommon
Common monitor, Bengal monitor	<i>Varanus bengalensis</i>	Visual	Common
Water monitor	<i>Varanus salvator</i>	Visual	Common
Rock python	<i>Python molurus</i>	Local report	Uncommon
Vine snake	<i>Ahaetulla</i> sp.	Visual	Common
Rat snake	<i>Ptyas/Coluber mucosus</i>	Visual (skin)	Common
Smooth water snake	<i>Enhydryis</i> sp.	Visual	Uncommon
Banded krait	<i>Bungarus fasciatus</i>	Local report	Common
King cobra	<i>Ophiophagus hannah</i>	Local report	Uncommon

* Estimates of status in the study area are based on both primary sources (direct observations, signs and preserved specimens) and secondary sources (reports from forest staff, villagers and others).

Assamese language), Poba Reserved Forest and then to D'Ering Memorial Sanctuary in Arunachal Pradesh. Some also move to Jamjing and Sengajan Reserved Forests.

Water buffalo

Wild water buffalo were also common and recorded throughout the area. Most of the individuals seen were large, lone bulls, because the female and immature animals remain in the cover of woodland or dense grass/reeds during the day (unlike the behaviour of the species in Kaziranga National Park in Assam; Choudhury, 1994a). An estimate (based on a sample count in c. 30 sq km as well as field visits to other areas and interviews) suggested that at least 250 buffaloes survive in the DSS. There are also some feral buffaloes on the fringes of the area and at least two small herds of these animals were observed during the surveys. They were easily distinguished by their smaller body size, smaller horns and less aggressive behaviour. There are not likely to

be any new feral buffaloes because domestic buffaloes are too valuable to their owners. The possibility of contamination of the wild stock as a result of hybridization with feral and domestic animals is unlikely. Wild bulls kill domestic males and for this reason domestic bulls are not usually kept in the villages and *khutis* (cattle and buffalo camps) on the edge of the sanctuary. A feral or stray domestic male has no chance of competing with wild bulls for access to wild females but some wild bulls join feral herds and regularly visit the *khutis* and villages on the edge of the sanctuary to mate with domestic female buffaloes. Therefore the gene flow is mostly one way.

Cats

I found pugmarks of tiger throughout almost the entire area. Tiger predation on cattle and buffalo in the *khutis* and fringe villages is not uncommon. Every year one or two tigers travel through tea plantations to visit Podumoni and Bherjan Reserved Forests. A



An immature wild water buffalo in *Salix* woodland (Anwaruddin Choudhury).

census carried out by the Forest Department using the 'pugmark count' method estimated that there were 27 tigers in 1993. My own assessment, based on field visits, interviews and records of cattle predation was 20–30 animals. Because of a fairly dense tiger population, the leopard is not found in the main sanctuary but mostly at the southern edge, including the tea plantations. However, it occurs in Podumoni Reserved Forest and Bherjan Reserved Forest. During the last 5 years at least 13 leopards captured from different tea estates and army cantonments south of the DSS were released inside the sanctuary. The clouded leopard has been recorded only once, in the Tongkrong area (N. Sharma, pers. comm.). The leopard cat and the jungle cat are the only smaller cats whose presence has been confirmed.

Primates

Hoolock gibbons were found in most of the sanctuary's woodland. The species disappeared from Podumoni Reserved Forest in the

1970s, while a lone female survives in Bherjan Reserved Forest. There are some small isolated populations in some of the larger village woodlands near the DSS: Motapung, Torajan-Joigukhowa and Na-Dhulijan. Although 31 groups were verified from sightings and calls (28 in the DSS and three outside), local reports and the extent of suitable habitat suggest the presence of at least another 20 groups in the DSS.

The rhesus macaque is abundant throughout the DSS and adjacent tea estates, but not in Bherjan and Podumoni. In these two pockets of forest, Assamese and pig-tailed macaques are abundant but they are rare inside the DSS.

The capped langur was found in the DSS and Podumoni but not in Bherjan. A small population survives in the village woodlands of Hatipoti-Motapung areas, north of Bherjan. The slow loris was seldom seen but past captures confirm its presence in the DSS and Bherjan. This species is, perhaps, extinct in Podumoni.

Other mammals

Gaur tracks were found in the Amarapur area outside the DSS. Gaur visit this area in winter, descending from the Dibang Valley district of Arunachal Pradesh. Other mammals seen during the survey included flying fox, wild pig, Malayan giant squirrel, Pallas's squirrel, Irrawaddy squirrel, Szechuan burrowing-shrew (in Podumoni) and Gangetic dolphin. Tracks of sambar, hog deer and muntjac were found regularly. Preserved antlers were seen in many of the fringe villages. The sloth bear and dhole are vanishing as a result of the regular flooding but individuals of both species are still found.

The DSS has an interesting population of feral horses (true feral: i.e. born free and living free). Numbering fewer than 100, these animals are found in three herds in Churke Chapori and Kolia Chapori.

Birds

To date, 313 species of birds have been confirmed from the sanctuary. Many nocturnal species and those that live in dense undergrowth were poorly represented in the surveys, suggesting that a higher number of species occurs than has been recorded. Some notable species are listed in Table 2. The DSS is an important wintering ground for waterfowl, and the white-winged wood duck is a rare resident. The Bengal florican is found in the grassland areas.

The sarus crane was recorded in Dhadum Pathar (*pathar* = field in the local Assamese language), outside the DSS in March 1994, the only record of the species in north-east India for several decades. The birds were of the nominate race *Grus antigone antigone*, whose known eastern limit was western Assam (92°E). The 1994 record extended the known range by about 500 km (95°35'E).

The DSS and adjacent areas, including parts of Arunachal Pradesh, are important staging areas for migratory waterfowl, including the common crane. A new migration route of the common crane was discovered near the DSS (Choudhury, 1994c,d).

The grey or Himalayan treepie *Dendrocitta formosae* and white-throated bulbul *Criniger flaveolus*, whose known residential range was above 600 m (Ali and Ripley, 1983), were found to be resident at 100 m (these two species are also found elsewhere in Assam at similar or even lower elevations; A. U. Choudhury, unpublished data). The survey also extended the eastern range of the nominate race of the spot-billed duck *Anas poecilorhyncha*, Eurasian griffon vulture *Gyps fulvus* and bank myna *Acridotheres ginginianus*. Other notable sightings included white-bellied heron and black-breasted parrotbill.

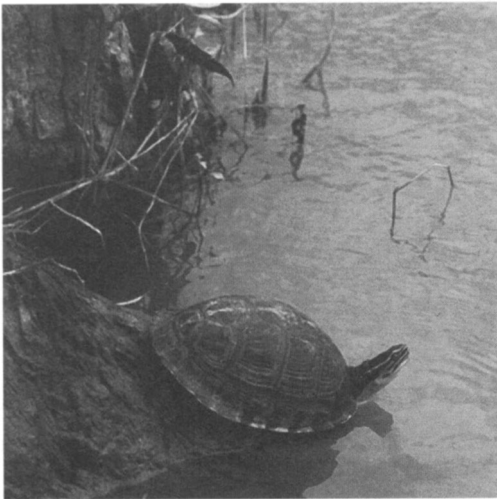
Reptiles

Among reptiles, turtles were covered comprehensively, based on actual sightings in the wild, identification from captured specimens and preserved shells collected from fringe villages. Nine species were recorded, including sightings of the narrow-headed softshell and Gangetic softshell, which had not been previously recorded in Assam (Das, 1991). The eastern ranges of the Malayan box turtle, spotted pond turtle, brown roof turtle and Assam roof turtle were extended considerably by this survey. The record of Asian leaf turtle in the DSS is the first for the species from alluvial floodplains.

Both common, or Bengal, monitor and water monitor were found to be common. Only a few species of snakes could be verified during the survey, although many more are present. The gharial has become extremely rare, with only a handful of reports from the Brahmaputra, Lohit and Dibru rivers. Table 3 lists the reptiles recorded.

Conservation problems

The DSS was commercially logged before notification as a sanctuary, which resulted in large areas being cleared. At present, illegal felling with the help and connivance of the forest villagers of Laika and Dadhia and some fringe villagers, is causing concern to the authorities. The forest villagers have also encroached



A Malayan box turtle (*Anwaruddin Choudhury*).

upon some forest land adjacent to their areas within the sanctuary but there are no encroachments from outside. About 9000 cattle and domestic buffaloes graze in the grasslands, especially in the fringe areas.

The waterbodies of the DSS are frequently used by small-time fishermen. Of most concern to the authorities is the use of poisons, such as Thiodan (a dangerous non-biodegradable pesticide used on the tea estates) by some fishermen to kill fish, especially in winter. Poaching is not a serious problem, except during floods, when deer and pigs moving to higher ground are killed in the tea estates and villages. The sale of turtles in the markets adjacent to the DSS has been stopped successfully by the authorities.

Flooding is a serious problem for the DSS, but Bherjan and Podumoni are above the reach of the floods. Many of the terrestrial mammals and birds drown or starve during severe floods. Erosion by the Brahmaputra and Lohit rivers and innumerable channels such as Kolomy, Ananta and Dadhia, also threaten rich grassland and woodland. Another major problem hindering conservation is insufficient infrastructure; only some 70 or so staff are distributed among the Guijan and Na-Barmura ranges and seven to nine camps.

Recommendations

- Part of the area excluded during final notification of the sanctuary should be added. This should include the southern part of Amarpur, Kopleng Chapori and some riverine stretches.
- A well defined core area should be designated as proposed by Choudhury (c. 190 sq km; 1994b), where human disturbance should be kept to the barest minimum.
- Efforts should be made to translocate Laika and Dadhia forest villages out of the sanctuary.
- More forest camps are needed, including mobile ones on boats, and more patrolling staff should be recruited.
- A radio network should be set up to link the forest camps and patrols with the range headquarters.
- Raised roads and platforms should be built to provide wildlife refuges during floods.
- Domestic stock should be inoculated regularly to prevent the possible spread of anthrax, rinderpest, etc. to wild ungulates. Non-governmental organizations, which did excellent work inoculating domestic stock on the fringes of Kaziranga and other reserves during 1995–96 (Choudhury, 1996b), could repeat these activities around the DSS, especially given the presence of a viable population of wild water buffalo.
- The DSS has already been proposed as a biosphere reserve as well as a tiger reserve (under Project Tiger). All the adjacent wildlife habitats, such as Kobo Chapori and Poba Reserved Forest, should also be included as part of this reserve. Bherjan, Podumoni and Borajan Reserved Forests should also be accorded sanctuary status.

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