PARC NATIONAL DES SUNDARBANS (452) INDE

SUNDARBANS NATIONAL PARK (452) INDIA

WORLD HERITAGE NOMINATION -- IUCN SUMMARY

452: SUNDARBANS (INDIA)

Summary prepared by IUCN (April 1987) based on the original nomination submitted by India. This original and all documents presented in support of this nomination will be available for consultation at the meetings of the Bureau and the Committee.

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1. LOCATION:

Lies south-east of Calcutta and forms part of the Gangetic Delta, which borders on the Bay of Bengal. The area nominated is the Sundarbans National Park which is a 133,000 ha core area within the 258,500 ha Sundarbans Tiger Reserve. 21°31'-21°53'N, 88°37'-89°09'E.

2. JURIDICAL DATA:

History of protection in the area dates back to 1878. The core area was made a Wildlife Sanctuary in 1977 and a National Park in 1984. Both the Indian Forest Act and the Wildlife Protection Act (1972) apply.

3. IDENTIFICATION:

The Sundarbans, covering some 10,000 sq. km of land and water (of which some 5,980 sq. km is in India and the rest in Bangladesh), is part of the world's largest delta (80,000 sq. km) formed from sediments deposited by three great rivers, the Ganges, Brahmaputra and Meghna, which converge on the Bengal Basin. The whole Sundarbans area is intersected by an intricate network of interconnecting waterways, of which the larger channels are often a mile or more in width and run in a north-south direction. Tidal waves are a regular phenomenon and may be up to 75m high. The land is constantly being changed, moulded and shaped by the action of the tides. About half of the tract is under water and the rest of the landscape is characterised by low-lying alluvial islands and mudbanks, with sandy beaches and dunes along the coast. The Sundarbans forest itself can be subdivided into four types: low mangroves, salt water forest, beach forest and sand dune vegetation.

The Sundarbans is the only remaining habitat in the lower Bengal Basin for a great variety of faunal species. The tiger population, estimated at 264 in 1983 is the largest in India. Ungulates are wild boar, main prey species of the tiger, and spotted deer. Aquatic mammals that frequent the tidal waters include the Ganges dolphin, Indo-Pacific hump-backed dolphin, Irrawaddy dolphin and finless porpoise. The Sajnakhali area contains a wealth of water birds, noteworthy residents including openbill stork, black-necked stork, and greater adjutant stork. This area is important for waders, including the Asian dowitcher, a rare winter migrant. The Sundarbans provides important habitat for a variety of reptiles including river terrapin, olive ridley, and estuarine crocodile.

4. STATE OF PRESERVATION/CONSERVATION:

The salinity of the Indian Sundarbans, largely due to the eastward shift of the mouth of the Ganges, is being influenced by upstream diversion of up to 40% of the dry season flow of the Ganges, the repercussions of which are not clearly understood. Oil spills are a potential threat which cause immense

damage, especially to aquatic fauna and seabirds and probably also to the forest itself into which oil could be carried by high tides. An average of 45 people were killed annually by tigers in 1975-1982. This has caused certain conflicts with local people who use the adjacent Tiger Reserve for collection of honey and firewood and for fishing.

5. JUSTIFICATION FOR INCLUSION ON THE WORLD HERITAGE LIST:

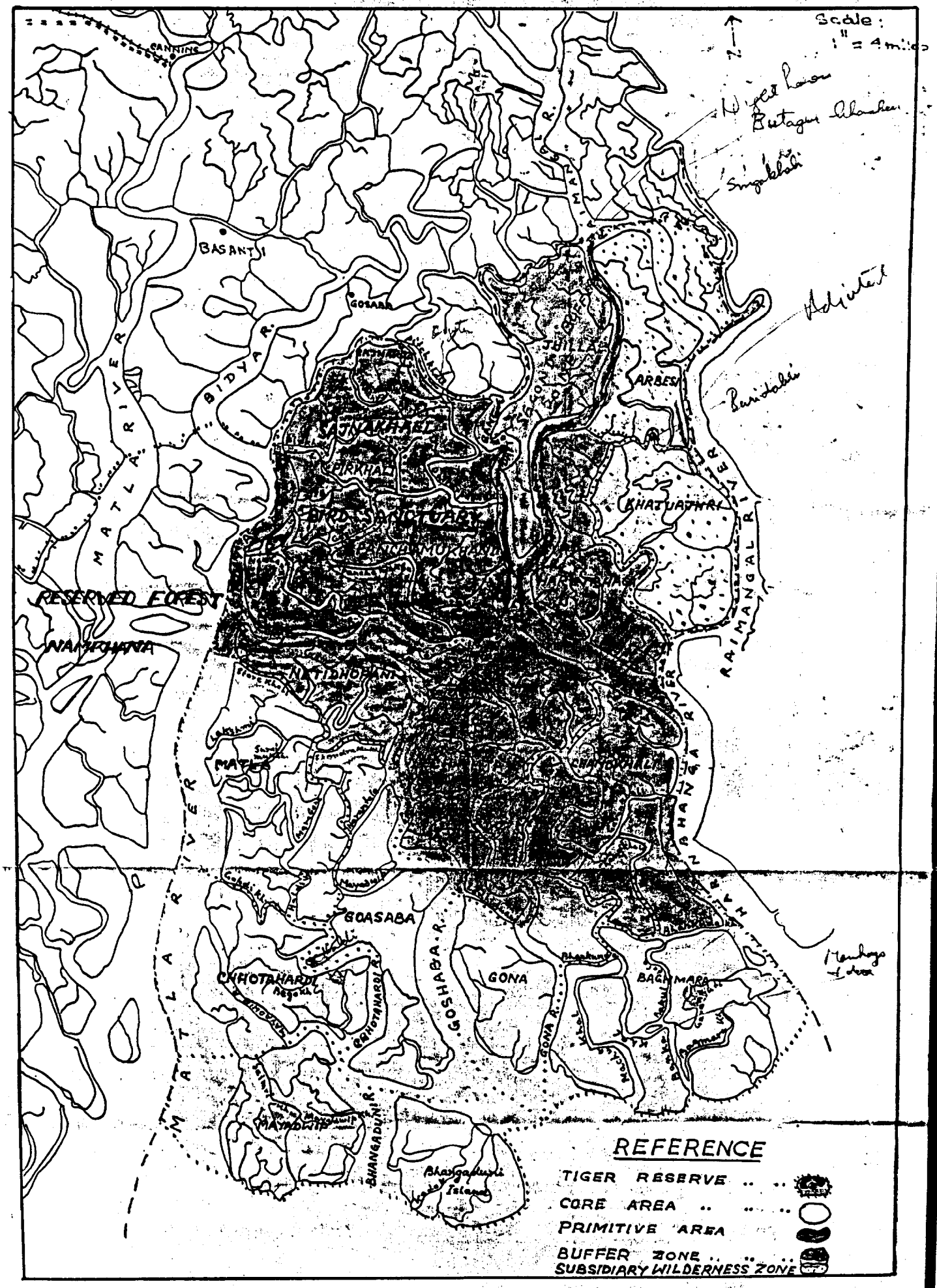
The Sundarbans nomination, as presented by the Government of India provides the following justification for designation as a World Heritage property:

a) Natural property

(ii) Outstanding example of biological evolution. The Sundarbans is the largest area of mangrove forest in the world and the only one that is inhabited by the tiger. Its role in wetland nursery for marine organisms and as a climatic buffer against cyclones is a unique natural process.

(iv) Habitat of rare and endangered species. The Sundarbans contains one the world's major habitat areas for tigers and also supports a wealth of faunal species including aquatic mammals, birds, and reptiles.

MAP OF
SUNDARBANS TIGER RESERVE



WORLD HERITAGE NOMINATION -- IUCN TECHNICAL EVALUATION

452 SUNDARBANS (India)

1: DOCUMENTATION

(i) IUCN Data Sheet
(ii) Consultations: P. Jackson, M. Halle, J. Blower, J. Seidensticker
(iii) Literature consulted: Global Status of Mangrove Ecosystems, IUCN, 1983; Handbook for Mangrove Area Management, IUCN, 1984.
(iv) Site visit: scheduled in November 1987.

2. COMPARISON WITH OTHER AREAS

Mangroves are characteristic littoral plant formations found on sheltered coastlines throughout the tropics and subtropics. Countries with the greatest extent of mangrove forests are Brazil, Indonesia, Australia and Nigeria. The Sundarbans mangrove area of India and Bangladesh when taken together forms one of the world's largest single patches: some 770,000 ha. In terms of species richness, the mangroves of the Indomalayan Realm have the greatest diversity.

Some 18 countries have established protected areas in mangrove forests. In most of these countries the individual areas under protection are less than 1,000 ha. However, protection is afforded to a total of over 11,000 ha. in four reserves in Venezuela and 26 reserves totalling more than 80,000 ha. have been established in Australia. The Everglades World Heritage site contains almost 100,000 ha. of mangrove making it the world's second largest mangrove protected area after the Sundarbans. There is also significant amounts of mangrove in Stage II of the Kakadu National Park but this has not yet been included in the World Heritage Site.

Within the Sundarbans there are three other gazetted reserves on the Bangladesh side. These are the wildlife sanctuaries of Sundarbans West (9,069 ha.); Sundarbans South (17,878 ha.) and Sundarbans East (5,439 ha.). None of these are contiguous with the Sundarbans National Park in India but all harbour similar species.

All four reserves in the Sundarbans collectively protect the only remaining habitat in the lower Bengal Basin for a great variety of faunal species including an exceptional number of threatened reptilian species. They are the only mangrove forests in the world inhabited by the tiger.

3. INTEGRITY

The Sundarbans National Park exists within the Sundarbans Tiger Reserve which acts as a buffer zone around the core area. The total area has a management plan (1973) but it is urgently in need of updating. Forest exploitation within the park is not allowed but seasonal permits are granted for collection of honey and palms. Local people may also fish in the tidal waters but require a permit for firewood collection. There has been a remarkable improvement of the biota in the park over the past 12 years which is reflected in the steady size of the tiger population which has risen from 181 in 1976 to 264 in 1983.

Concern has been expressed about recent indications of deterioration in the flora of the Sundarbans including localised die-back of certain species. There is some evidence that these changes may be due to increasing salinity resulting from the upstream diversion of up to 40% of the dry season flow of the Ganges River. Oil spills are another potential threat and could cause immense damage especially to aquatic fauna and seabeds.

4. ADDITIONAL COMMENTS

The Sundarbans mangroves cover some 774,000 ha. of land and water (of which 417,000 ha. are in Bangladesh and 357,000 ha. are in India) and are a part of the world's largest delta. The name of the site as proposed by India is "Sundarbans" which is too general. The ideal name for the property would be "The Sundarbans Mangrove Reserves of India and Bangladesh" but as the Government of Bangladesh has not yet formally nominated the adjoining reserves, the most descriptive name would be the Sundarbans National Park, India.

5. EVALUATION

The Sundarbans is one of the largest remaining areas of mangrove vegetation in the world and is a unique and productive wildlife area. The forest and waterways support a wide range of fauna including a number of species threatened with extinction. The area qualifies for World Heritage listing under criterion IV - Habitats of Rare and Endangered Species. The Sundarbans is especially important for the Bengal Tiger as there is no other protected area with more than 100 individuals (Sundarbans National Park has 264). Together with the surrounding Tiger Reserve the National Park is of sufficient size to maintain viable populations of the key species.

The area also qualifies under criterion II as an outstanding example of significant on-going geological processes in terms of its exceptional portrayal of the natural processes of the effects of monsoonal rains, flooding, delta formation and plant colonisation.

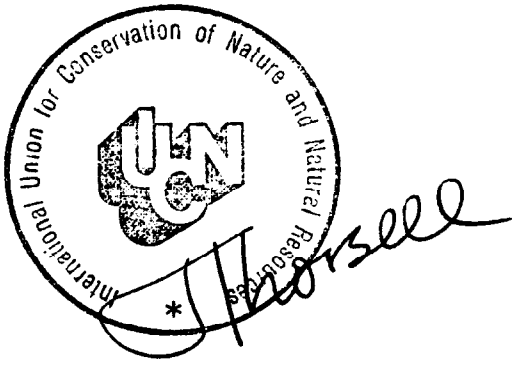
6. RECOMMENDATIONS

Results of the field review of the nominated site are not yet available but the following provisional suggestions were made for consideration by the Bureau:

-- the Sundarbans National Park should be inscribed on the World Heritage List. Future inclusion of the reserves on the Bangladesh side to form an international Sundarbans Mangrove Reserve World Heritage Site should be encouraged.

-- the management plan for the existing Tiger Reserve was compiled in 1973 and is in urgent need of revision.

-- threats to the viability of the Park due to diversion of water from upstream sources should be monitored.



INDIA - West Bengal

NAME **Sundarbans** National Park

MANAGEMENT CATEGORY I (Strict Nature Reserve)
X (World Heritage)

BIOGEOGRAPHICAL PROVINCE 4.03.01 (Bengalian Rainforest)

GEOGRAPHICAL LOCATION Lies south-east of Calcutta in the 24-Paraganas District of West Bengal and forms part of the Gangetic Delta, which borders on the Bay of Bengal. Consists of Matla, Goashaba, Chhotahardi, Mayadwip, Chamta, Gona and Baghmara forest blocks, which are bounded by the Matla/Bidya and Haribhanga/Raimangal rivers to the east and west, respectively. The northern boundary is buffered by Netidhopani and Chandkhali forest blocks. 21°31′-21°53′N, 88°37′-89°09′E

DATE AND HISTORY OF ESTABLISHMENT Established as a national park on 4 May 1984 (Notification No. 2867-For). Previously created a wildlife sanctuary in 1977, having been designated as the core area of **Sundarbans** Tiger Reserve in December 1973. All forest in 24-Paraganas District was first notified as protected forest on 7 December 1878. Much of this was subsequently leased out by the government for purposes of cultivation, but the boundaries of the remaining protected forests were fixed under Notification No. 4457-For, dated 9 April 1926. Protected forests remaining in the Basirhat Division of the district were declared reserved forests on 9 August 1928 (Notification No. 15340) and those remaining in Namkhana Division on 29 May 1943 (Notification No. 7737-For). Inscribed on the World Heritage List in 1985.

AREA 133,010ha. Constitutes the core area of **Sundarbans** Tiger Reserve (258,500ha). Sajnakhali Wildlife Sanctuary (36,234ha) lies within the buffer zone, to the north of Netidhopani and Chandkhali forest blocks. Halliday Island (583ha) and Lothian Island (3,885ha) wildlife sanctuaries are in the west of the **Sundarbans** but are not part of the tiger reserve. The wildlife sanctuaries of **Sundarbans** East (5,439ha), **Sundarbans** West (9,069ha) and **Sundarbans** South (17,878ha) lie to the east in Bangladesh but are not contiguous either with the tiger reserve or each other.

LAND TENURE Government

ALTITUDE Ranges from sea level to 10m at the most.

PHYSICAL FEATURES The **Sundarbans**, covering some 10,000 sq. km of mangrove forest and water (of which some 40% is in India and the rest in Bangladesh), is part of the world's largest delta (80,000 sq. km) formed from sediments deposited by three great rivers, the Ganges, Brahmaputra and Meghna, which converge on the Bengal Basin. The whole **Sundarbans** area is intersected by an intricate network of interconnecting waterways, of which the larger channels are often a mile or more in width and run in a north-south direction. These waterways, apart from the Baleswar River on the eastern edge of the Bangladesh **Sundarbans**, now carry little freshwater

as they are mostly cut off from the Ganges, the outflow of which has shifted from the Hooghly-Bhagirathi channels progressively eastwards since the seventeenth century (Seidensticker and Hai, 1983). This is due to subsidence of the Bengal Basin and a gradual eastward tilting of the overlying crust. In the Indian **Sundarbans**, the western portion receives some freshwater through the Bhagirathi-Hooghly river system but that portion designated as the tiger reserve is essentially land-locked, its rivers
having become almost completely cut off from the main freshwater sources over the last 600 years (Sanyal and Bal, 1986). Thus, waterways in the tiger reserve are maintained largely by the diurnal tidal flow, the average rise and fall being about 2.15m on the coast and up to 5.68m on Sagar Island (Lahiri, 1973). Tidal waves are a regular phenomenon and may be up to 75m high. The land is constantly being changed, moulded and shaped by the action of the tides, with erosion processes more prominent along estuaries and deposition processes along the banks of inner estuarine waterways influenced by the accelerated discharge of silt from seawater (Sanyal and Bal, 1986). About half of the **Sundarbans** is under water (Lahiri, 1973) and the rest of the landscape is characterised by low-lying alluvial islands and mudbanks, with sandy beaches and dunes along the coast. As with the rest of the Bengal Plain, alluvial deposits are geologically very recent and deep, sediment of just the last few million years being as much as 1,000m thick (Seidensticker and Hai, 1983). The subsoil consists of alternate layers of clay and sand, gradually changing into shales and sandstone. The soil is clayey loam down to a depth of 1.1-1.4m and thereafter stiff black clay. It is alkaline due to an excess of sodium chloride (Lahiri, 1973). An estimation of land loss and accretion has been made using remote sensing techniques (Murthy Naidu and Madhavan Unni, 1986).

CLIMATE Rainfall is heavy and humidity high (80% on average) due to the proximity of the Bay of Bengal. The monsoon usually lasts from mid-June until mid-September, after which fair weather prevails until mid-March. The mean annual rainfall recorded at the observatory on the nearby Island of Sagar was 2002mm in 1937-1946, that for Jhingakhali Station in the northern part of the reserved forests was 1920mm in 1970-1972. Mean annual maximum and minimum temperatures recorded at the latter was 34°C and 20°C, respectively. Prevailing wind is from the north and north-east from October to mid-March, although January and February are calm. Violent south-westerlies prevail from mid-March to September. Storms are common in May and October-November, sometimes developing into cyclones which are usually accompanied by tidal waves and cause much loss of life and damage to property and the forests (Lahiri, 1973). Meteorological data for 1955-1960 are presented by Mukherjee (1975). There are meteorological stations at Haldi, Jhingakhali and Sajnakhali.

VEGETATION The entire mangrove forest extends over an area of 4,262 sq.km, of which 2,320 sq.km is forest and the rest is water (Mukherjee, 1975), and is called Sundarban owing to the dominance of the tree species *Heritiera fomes*, locally known as 'sundari' because of its elegance (Jain and Sastry, 1983). This marsh vegetation consists of elements of the Malayan Peninsular and Polynesian regions, together with some Indo-Chinese,

Ethiopian and a few of the New World. It is not found elsewhere except in a small part of the Mahanadi and Godaveri deltas to the south-west and the Bay Islands (Mukherjee, 1975). Prain (1903) lists 334 species found in the **Sundarbans**. Champion (1936) classified the **Sundarbans** as moist tropical seral forest, comprising beach forest and tidal forests. The latter are subdivided into four types, of which only low mangrove forest and salt-water Heritiera forests occur within Indian territory. Beach forest occurs on coastal islands comprising low sand-dunes which, together with lime formed from disintegrating shells and salt, give rise to a pronounced xerophytic habitat despite the high rainfall. Sand-dunes are partially covered with spear-grass, behind which are creepers and shrubs or trees, such as jhao Tamarix troupii, palita Erythrina variegata and kulsi Aegiceras corniculatus. Salt-water Heritiera forest (6-11m high), a low salinity vegetation type, occurs between the Raimangal and Matla rivers, where freshwater flows from the Ichhamati River into the Raimangal River. Characteristic species include garjan Rhizophora sp., kankra Bruguiera gymnorhiza, goran Ceriops sp., and baen Avicennia officinalis. Heritiera fomes is scattered over areas of higher elevation, along with keora Sonneratia apetala, gengwa Excoecaria agallocha, dhundul Carapa obovata and the date palm or hental Phoenix paludosa. The golpata palm Nipa fruticans is relatively uncommon but occurs on wet mud-banks along the creeks. Low mangrove forest (3-6m high) occurs between Matla and Muriganga, to the west of the national park and tiger reserve, this area being devoid of freshwater because its rivers are cut off from the ramifications of the Hooghly in the north. Soft mud, which is submerged by the tides, supports a dense forest, very similar in composition to salt-water Heritiera forest except that sundari and golpata are virtually absent. Goran and baen are the commonest trees, occupying extensive areas but only growing up to 2m. Clusters of hental are very common. Certain forest tracts on low-lying islands were cleared some two hundred years ago and gradually claimed for cultivation. Various trees and other plants were introduced, including some exotics (Mukherji, 1975; also see Lahiri, 1975; Jain and Sastry, 1983). In a more recent examination of the composition and structure of the mangrove vegetation, 69 plant species are identified (Calcutta University, 1987). This report also includes inventories of algae, phytoplankton and fungi.

FAUNA The **Sundarbans** is the only remaining habitat in the lower Bengal Basin for a great variety of faunal species. Some of this variety, however, has already been lost owing to the reclamation of the broad transitional belt of habitat for agriculture, combined with the higher salinity resulting partly from the large-scale irrigation schemes in the upper reaches of the Ganges. Species include the Javan rhinoceros Rhinoceros sondaicus (E) and water buffalo Bubalus bubalis (V), last recorded in 1870 and 1885, respectively, swamp deer Cervus duvauceli (E), which existed in good numbers until early this century, and Indian muntjac Muntiacus muntjak, last reported on Halliday Island in the late 1970s (Mukherjee, 1975; Sanyal, 1983). Similarly, gharial Gavialis gangeticus (E) and narrow-headed softshell turtle Chitra indica became locally extinct within the last century (Sanyal, n.d.). Mukherjee (1975) provides an extensive account of the vertebrate and invertebrate fauna. More recently, inventories have been compiled (Calcutta University, 1987; Sanyal, n.d.).

Infobase produced by WCMC, January 1992

The tiger Panthera tigris (E) population, estimated at 264 in 1983 (Chowdhury and Sanyal, 1985), is the largest in India. High population density, relative to the availability of prey, and the relatively high frequency of encounters with local people (within the tiger reserve) is probably largely responsible for the notorius man-eating habits of the **Sundarbans** tiger (also see Hendrichs, 1975; Chakrabarti, 1986a). The fishing cat Felis viverrinus abounds (Sanyal, n.d.). The only ungulates are wild boar Sus scrofa, main prey species of the tiger, and spotted deer Cervus axis, which is plentiful and often seen in association with rhesus macaque Macaca mulatta. Aquatic mammals that frequent the tidal waters include the Ganges dolphin Platanista gangetica, Indo-Pacific hump-backed dolphin Sousa chinensis, Irrawaddy dolphin Orcaella brevirostris and finless porpoise Neophocaena phocaenoides (Mukherjee, 1975).

The Sajnakhali area contains a wealth of water birds, noteworthy residents including Asian openbill stork Anastomus oscitans, black-necked stork Ephippiorhynchus asiaticus, greater adjutant stork Leptoptilos dubius, white ibis Threskiornis melanocephalus, swamp francolin Francolinus gularis, white-collared kingfisher Halcyon chloris, black-capped kingfisher H. pileata and brown-winged kingfisher Pelargopsis amauroptera. This area is important for waders, including the Asian dowitcher Limnodromus semipalmatus (R), a rare winter migrant. Interesting marsh birds found in the reclaimed areas include egrets Egretta alba, E. garzetta and E. intermedia, purple heron Ardea purpurea (a rare vagrant from Africa) and green-backed heron Butorides striatus, while birds of prey include osprey Pandion haliaetus, Pallas's fish eagle Haliaeetus leucoryphus, white-bellied sea-eagle H. leucogaster, grey-headed fishing eagle Ichthyophaga ichthyaetus, peregrine falcon Falco peregrinus, Oriential hobby F. severus, northern eagle owl Bubo bubo and brown fish owl Ketupa zeylonensis. A variety of terns (Sterna and other genera) and kingfishers are seen on the large rivers and in flooded areas (Mukherjee, 1975). Other details of the avifauna are given by Law (1954, 1956).

The **Sundarbans** provide important habitat for a variety of reptiles including river terrapin Batagur baska (E), olive ridley Lepidochelys olivacea (E), estuarine crocodile Crocodylus porosus (E), monitor lizard Varanus flavescens, water monitor V. salvator and Indian python Python molurus (V) (Mukherjee, 1975). The only species of turtle known to nest in the **Sundarbans** is the olive ridley but hawksbill Eretmochelys imbricata has been caught in fishermen's nets (Bhaskar, 1984). The creeks are spawning grounds for some 90 species of fish (Chakrabarti, 1987a), 48 species of crabs and a large variety of molluscs (see 1986 World Heritage nomination).

CULTURAL HERITAGE Baghmara Forest Block contains the ruins of a city built by the Chaand Sandagar merchant community approximately 200-300 AD. Much later, during the Moghul Empire, Raja Basand Rai and his nephew took refuge in the **Sundarbans** from the advancing armies of Emperor Akbar. The buildings which they erected subsequently fell to Portuguese pirates, salt smugglers and dacoits in the 17th century. The ruins are evident at Netidhopani and elsewhere. The **Sundarbans** feature prominently in Bengali

literature, for example Bankim Chandra Chatterjee's novel "Kapal Kundla". Banbibi, incarnation of the Goddess Durga, is the reigning deity in the area. Her blessings are sought for protection from the tiger (V. Rishi, pers. comm.). Reclamation of the **Sundarbans** commenced in 1770 and is described by Bandyopadhyay (1985).

LOCAL HUMAN POPULATION There is no resident human population within the tiger reserve (Lahiri, 1973). Some 35,330 people work in the forest annually, of which 4,580 collect timber and firewood, 24,900 are fisherman, 1,350 collect honey and 4,500 are involved in other activities (Chakrabarti, 1986a). various aspects of honey production are discussed by Chakrabarti (1987c). On average some 4,000 fishermen are active each day, and the mean annual catch is 2,500 tonnes (Chakrabarti, 1986c).

VISITORS AND VISITOR FACILITIES Visitors are not allowed within the national park. Elsewhere in the tiger reserve, the Sundar Cheetal Tourist Lodge at Sajnakhali provides the only accommodation (60 beds). Here, the Mangrove Information Centre has recently been completed. Nearby is a heronry which can be visited by boat. There are watchtowers at Sajnakhali, Sudhanyakhali, Netidhopani, Haldi and a number of other places. Access to the tiger reserve is by permit and via Port Canning, by boat and/or bus to Basanti, Gosaba and Sajnakhali. Launches can be hired from the Tourist Bureau or **Sundarbans** Launch Association in Calcutta.

SCIENTIFIC RESEARCH AND FACILITIES Early contributions to the flora and avifauna include Prain (1903) and Law (1954, 1956), respectively. Mukherjee (1975) gives a fairly comprehensive account of both flora and fauna, based largely on his visits to the **Sundarbans** in 1955-1960. Mukherjee and Gupta (1965) examined the habits of the rhesus macaque and Mukherjee (1969, 1971, 1972) studied the feeding behaviour of the water birds. Factors associated with man-eating by tigers are analysed by Chakrabarti (1986a). The tiger population is censused every five years. Chakrabarti (1986b, 1987b) has shown that species diversity is greater below the tidal level than above and that in general floral diversity is lower than in the forests of North and Sourh Bengal. A long-term monitoring programme has been carried out since 1980 by the Marine Science Department of Calcutta University (1987). A preliminary floral survey has been conducted jointly by **Sundarbans** Tiger Reserve and Botanical Survey of India. Likewise, the fauna has been surveyed by the **Sundarbans** Tiger Reserve and Zoological Survey of India. The latter has set up a research station at Canning Town. There is also the Central Inland Fisheries Research Station at Kakdwip, Sagar Marine Biological Institute on the westernmost island and Central Soil Saline Research Institute at Canning Town (Sanyal, n.d.). An outlines of the ecology, botany and forestry is given by Blasco (1977).

CONSERVATION MANAGEMENT Apart from being the only mangrove forest in the world inhabited by the tiger, the **Sundarbans** contains a rich and unique biota, with a notable number of threatened reptiles. It buffers the inland areas from the ravages of cyclones from the Bay of Bengal. It also provides the main nursery for shrimps along the whole coast of eastern India, as well as its creeks being the spawning grounds for a wealth of

fish and crustaceans. That part of the **Sundarbans** lying in Indian territory is managed under the aegis of Project Tiger. In the original management plan (Lahiri, 1973), the core area, now a national park, is designated a wilderness zone (133,010ha) within which 12,440ha is earmarked as a Primitive Area strictly reserved for preservation. The remaining area comprises a buffer zone. No forestry operations or any other type of interference is allowed in the core area. Elsewhere in the tiger reserve, forests are subject to 'selection-cum- improvement' felling. Exploitation of the hental date palm and golpata palm, and seasonal collection of honey are allowed on a permit basis. Local people may also fish in the tidal waters but require a permit for firewood used during such trips (Lahiri, 1973). A new management plan has been prepared and submitted for approval. In 1982, 24 captive-bred estuarine crocodiles were re-introduced to the area. There has been a marked improvement in the biota, which has ultimately been reflected in a steady rise in the tiger population. Based on censuses of tracks, data suggest that the tiger population has increased at an annual rate of 7% from 181 in 1976 to 264 in 1983 (Chowdhury and Sanyal, 1985). Freshwater ponds have been constructed in several localities for the benefit of the wildlife. Olive ridleys are reared in captivity at Sajnakhali and for subsequent release into the national park. Proposals to establish a **Sundarbans** Biosphere Reserve (Sanyal, n.d.) are under consideration. The proposed area of 9,630 sq.km south of the "Dampier-Hodges Line" comprises the tiger reserve and national park, three wildlife sanctuaries, and reclaimed intertidal areas having only a single crop per year.

MANAGEMENT PROBLEMS Siltation appears to be an increasing problem. For example, it is thought by local fishermen that within the next few years the Matla River will no longer be navigable up to Canning Town. There are plans to construct a fertiliser plant at Mathurapur, just 5km from the Satpukur sluice gate at the edge of the **Sundarbans**. Harmful effluents (sulphur dioxide, sulphates and fluorine) would enter the waterways of the **Sundarbans** (Gupta, 1987). Oil spills are a potential threat which cause immense damage, especially to aquatic fauna and seabirds and probably also to the forest itself into which oil could be carried by high tides (Blower, 1985). An average of 45 people were killed annually by tigers in 1975-1982. This casualty rate has fallen since the introduction of various measures, including deterrents in the form of electrified human dummies (Chowdhury and Sanyal, 1985) and face masks worn on the back of the head (V. Rishi, pers. comm.). In 1986 there were 28 victims and in 1987, 24, but none of these had been using the face-masks (Anon., 1989). Reclamation in the **Sundarbans** ecosystem has lead to problems of salinistion and soil acidifiction (Bandyopadhyay, 1985) although the degree to which this affects the national park is not known.

STAFF There are 202 personnel headed by the Field Director and including 68 enforcement staff, one research officer and one assistant research officer (1986/87).

BUDGET Rs 50 lakh, of which Rs 35 lakh is from the State Government and the rest from Central Government (1986/87)

Infobase produced by WCMC, January 1992

LOCAL ADMINISTRATION Field Director, **Sundarbans** Tiger Reserve, Government of West Bengal, Directorate of Forests, Canning Town, District 24-Parganas, West Bengal

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DATE January 1987, updated November 1987 and May 1990
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Infobase produced by WCMC, January 1992

PARC NATIONAL DES SUNDARBANS (452) INDE

SUNDARBANS NATIONAL PARK (452) INDIA

DESIGNATION POUR LA LISTE DU PATRIMOINE MONDIAL -- RESUME PREPARE PAR L'UICN

452: SUNDARBANS (INDE)

Résumé préparé par l'UICN (avril 1987) d'après la désignation d'origine soumise par l'Inde. L'original et tous les documents présentés à l'appui de cette désignation seront disponibles pour consultation aux réunions du bureau et du comité.

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1. SITUATION:

Situé au sud-est de Calcutta, dans une partie du delta du Gange, au nord de la baie du Bengale. La région candidate est celle du Parc national des Sundarbans qui constitue le coeur (région de 133 000 ha) de la réserve de tigres des Sundarbans (258 500 ha). 21°31'-21°53'N, 88°37'-89°09'E.

2. DONNEES JURIDIQUES:

La protection de la région remonte à 1878. La région centrale fut proclamée sanctuaire de la faune en 1977, et parc national en 1984. Il relève à présent de la loi sur les Forêts (Forest Act) et de la loi de Protection de la Faune et de la Flore, de 1972 (Wildlife Protection Act).

3. IDENTIFICATION:

Les Sundarbans, qui couvrent 10 000 km^2 de terre et d'eau (dont 5980 km^2 en Inde et le reste au Bangladesh), font partie de plus grand delta du monde (80 000 km^2) formé par les sédiments déposés par trois grands fleuves, le Gange, le Brahmapoutre et la Meghna, qui convergent sur le bassin du Bengale. La région des Sundarbans est traversée de part en part par un réseau complexe de cours d'eau reliés les uns aux autres, dont les plus importants ont souvent plus d'un kilomètre de large et coulent dans une direction nord-sud. Des vagues tidales surviennent régulièrement et peuvent atteindre une hauteur de 75 m. Le paysage est en constante modification, façonné par l'action des marées. Près de la moitié de la frange côtière est sous l'eau, et le reste se présente sous forme d'îles alluviales basses et de bancs de boue avec des plages sablonneuses et des dunes le long des côtes. La forêt des Sundarbans se subdivise en quatre types: Mangroves basses, forêt hygrophile, forêt de plage et végétation de dunes.

Les Sundarbans sont le dernier habitat d'une grande variété d'espèces animales du bassin inférieur du Bengale. Sa population de tigres, estimée à 264, en 1983, est la plus grande de l'Inde. Les ongulés sont représentés par le sanglier, principale proie du tigre, et le cerf tâcheté. Les mammifères marins qui fréquentent les eaux tidales sont le dauphin du Gange, le dauphin à bosse indo-pacifique, le dauphin Irrawaddy et le marsouin sans nageoires. La région de Sajnakhali est riche en avifauve, avec notamment des becs en ciseaux, des cigognes à cou noir (Xenorhychus asiaticus) et Leptoptilos dubius. Cette région est importante pour les échassiers, notamment le macroramphe (Limnodromus semipalmatus), espèce rare d'oiseau migrateur d'hiver. Les Sundarbans constituent un important habitat pour toute une variété de reptiles, notamment la tortue fluviale indienne, la tortue olivâtre et le crocodile marin.

4. ETAT DE PRESERVATION/CONSERVATION:

La salinité des Sundarbans, due en grande partie au décalage vers l'est de l'embouchure du Gange, est influencée par la diversion en amont de 40% des eaux du Gange à la saison sèche, avec des conséquences encore mal comprises. Les déversements d'hydrocarbures constituent une menace potentielle, et risquent de causer des dégâts considérables à la faune aquatique et aux oiseaux de mer, ainsi qu'à la forêt elle-même que le pétrole pourrait atteindre à marée haute. En moyenne, 45 personnes sont été tuées chaque année par des tigres de 1975 à 1982. Cela suscite des conflits avec la population locale qui cherche du miel, ramasse du bois et pêche dans la réserve de tigres voisine.

5. RAISONS JUSTIFIANT LA DESIGNATION POUR LA LISTE DU PATRIMOINE MONDIAL:

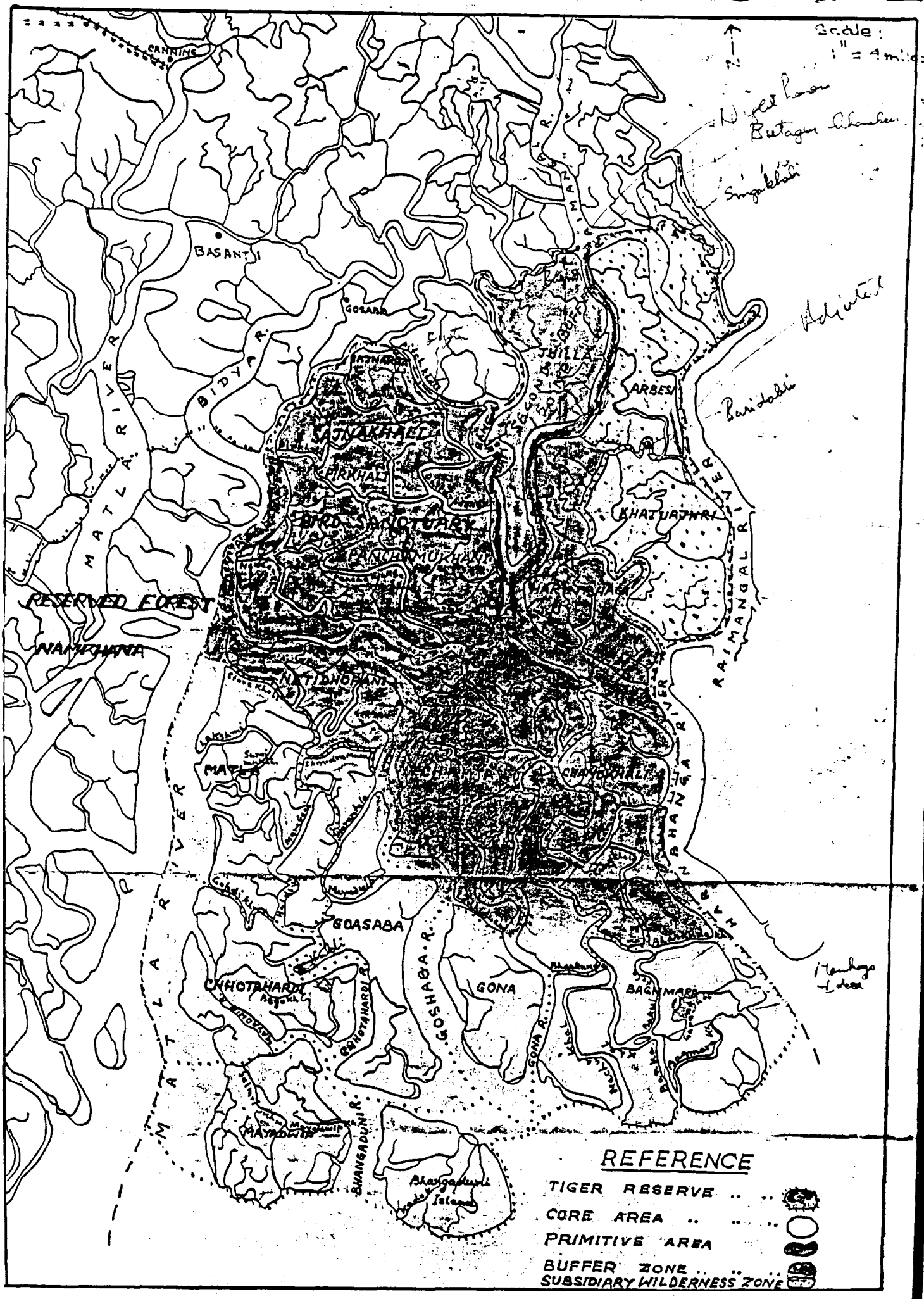
Pour justifier la désignation des Sundarbans en tant que bien du patrimoine mondial, le Gouvernement indien a donné les raisons suivantes:

a) Bien naturel

(ii) Exemple remarquable d'évolution biologique. Les Sundarbans sont la plus grande région de forêts de mangroves du monde, et la seule habitée par le tigre. Il s'y déroule d'importants processus naturels: Cette zone humide permet le développement d'organismes marins, et est une zone tampon amortissant les cyclones.

(iv) Habitat d'espèces rares ou menacées. Les Sundarbans sont l'un des grands habitats mondiaux du tigre; ils sont très riches en espèces animales, notamment en mammifères aquatiques, oiseaux et reptiles.

SUNDARBANS TIGER RESERVE



452 SUNDARBANS (INDE)

1. DOCUMENTATION:

(i) Fiches de données de l'UICN
(ii) Consultations: P. Jackson, M. Halle, J. Blower, J. Seidensticker
(iii) Littérature consultée: Global Status of Mangrove Ecosystems, UICN, 1983; Handbook for Mangrove Area Management, UICN, 1984.
(iv) Visite du site: prévue pour novembre 1987.

2. COMPARAISON AVEC D'AUTRES AIRES:

Les mangroves sont des formations végétales caractéristiques des littoraux dans toutes les régions tropicales et subtropicales. Le Brésil, l'Indonésie, l'Australie et le Nigéria sont les pays qui possèdent les plus grandes superficies de mangroves. La région de mangrove des Sundarbans prise dans son ensemble (c'est-à-dire la partie qui se trouve en Inde ajoutée à celle qui est au Bangladesh) forme, à elle seule, une des plus grandes superficies de mangrove du monde: environ 770 000 hectares. Les mangroves du domaine indo-malais possèdent la plus grande diversité d'espèces.

Quelque 18 pays ont établi des aires protégées contenant des forêts de mangrove. Dans la plupart de ces pays, chaque aire de mangrove protégée couvre moins de 1000 hectares. Toutefois, plus de 11 000 hectares, au total, sont protégés dans quatre réserves vénézuéliennes et l'Australie compte 26 réserves couvrant, en tout, plus de 80 000 hectares. Le bien du patrimoine mondial des Everglades contient près de 100 000 hectares de mangrove, ce qui en fait le deuxième site protégé au monde, après les Sundarbans. L'étape II du Parc national de Kakadu contient aussi une importante superficie de mangrove mais ne fait pas encore partie du bien du patrimoine mondial.

A l'intérieur des Sundarbans se trouvent aussi trois autres réserves classées, du côté du Bangladesh. Il s'agit des Sanctuaires de faune des Sundarbans ouest (9069 hectares), Sundarbans sud (17 878 hectares) et Sundarbans est (5439 hectares). Aucun de ces sites n'est contigu au Parc national des Sundarbans qui se trouve en Inde mais tous contiennent des espèces semblables.

Ensemble, les quatres réserves des Sundarbans protègent le dernier habitat, dans le bassin inférieur du Bengale, d'une grande variété d'espèces de la faune, notamment d'un nombre exceptionnel d'espèces de reptiles menacées. Ce sont les seules forêts de mangrove au monde où vive le tigre.

Le Parc national des Sundarbans se trouve à l'intérieur de la Réserve de tigres des Sundarbans qui fait office de zone tampon autour de la zone centrale. Un plan de gestion s'applique à l'ensemble de l'aire depuis 1973 mais il importe de le mettre à jour, de toute urgence. L'exploitation de la forêt n'est pas autorisée à l'intérieur du parc mais des permis saisonniers sont accordés pour la récolte du miel et des feuilles de palme. La population locale est également autorisée à pêcher dans les eaux tidales mais il faut un permis pour ramasser du bois de feu. L'état du milieu biologique du parc s'est remarquablement amélioré ces derniers 12 ans: la preuve en est la population de tigres qui est passée de 181 individus en 1976 à 264 en 1983.

Certaines indications récentes d'une déterioration de la flore des Sundarbans, notamment de la disparition locale de quelques espèces, suscitent des inquiétudes. Il se pourrait que ces modifications soient dues à une augmentation de la salinité résultant d'un détournement, en amont, de plus de 40% des eaux de décrue du Gange. Des marées noires pourraient aussi menacer la région et causer des dommages considérables à la faune aquatique et aux herbiers marins, en particulier.

4. COMMENTAIRES ADDITIONNELS:

La mangrove des Sundarbans couvre quelque 774 000 hectares de régions terrestres et aquatiques (417 000 hectares se trouvent au Bangladesh et 357 000 en Inde) et fait partie du plus grand delta du monde. Le nom proposé par l'Inde est "Sundarbans" qui est trop général. L'idéal serait de désigner le bien sous le nom de "Réserves de mangrove des Sundarbans d'Inde et du Bangladesh" mais, comme le gouvernement du Bangladesh n'a pas encore officiellement désigné les réserves voisines, le nom le plus descritif serait "Parc national des Sundarbans, Inde".

5. EVALUATION:

Les Sundarbans possèdent une des régions de mangrove les plus étendues du monde. C'est une région unique, riche en faune et en flore. La forêt et les chenaux abritent de nombreuses espèces de la faune, y compris plusieurs espèces menacées d'extinction. L'aire mérite de figurer sur la Liste du patrimoine mondial, conformément au Critère iv -- habitat d'espèces rares et menacées. Les Sundarbans sont particulièrement importants pour le tigre du Bengale car il n'existe aucune autre aire protégée contenant plus de 100 individus (le Parc national des Sundarbans en a 264). Ensemble, la Réserve de tigres voisine et le Parc national ont des dimensions suffisantes pour maintenir des populations viables des espèces essentielles.

L'aire satisfait également au Critère ii -- exemple exceptionnel de processus géologiques importants en cours; y sont en effet à l'oeuvre les processus naturels des effets des pluies de mousson, des inondations, de la formation du delta et de la colonisation par les plantes.

6. RECOMMANDATIONS:

Les résultats de l'étude du site désigné sur le terrain ne sont pas encore disponibles mais les suggestions suivantes peuvent être portées à l'attention du Bureau:

-- le Parc national des Sundarbans devrait être inscrit sur la Liste du patrimoine mondial. Il serait bon d'encourager l'incorporation des réserves se trouvant au Bangladesh dans un bien international du patrimoine mondial des réserves de mangrove des Sundarbans;

-- le plan de gestion de la Réserve de tigres date de 1973 et doit être révisé, de toute urgence;

-- il importe de surveiller les menaces que le détournement de l'eau, en amont, fait peser sur la viabilité du parc.