

World Heritage Sites

Protected Areas and World Heritage



KAZIRANGA NATIONAL PARK INDIA

This Park is one of the last areas in eastern India almost undisturbed by man. It is a forest-edged riverine grassland maintained by fire and annual floods inhabited by the world's largest populations of one-horned rhinoceroses and elephant. The numbers of prey species is high enough to support a dense and growing population of tigers. There is a wide diversity of animals, including leopards, bears, several species of deer and thousands of birds.

COUNTRY

India

NAME

Kaziranga National Park

NATURAL WORLD HERITAGE SITE

1985: Inscribed on the World Heritage list under Natural Criteria ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Burma Monsoon Forest (4.09.04)

GEOGRAPHICAL LOCATION

Situated on the southern bank of the Brahmaputra River at the foot of the Mikir - Karbi Anglang Hills about 8 km from Bokakhat and 220 km east of Guwahati, the Assam state capital. National Highway No.37 forms the southern boundary. Its coordinates are 26° 30' to 26° 45'N and 93° 05' to 93° 40'E.

DATES AND HISTORY OF ESTABLISHMENT

1908: Established as a reserved forest to protect the one-horned rhinoceros; 1916 a game reserve;

1938: Reserve opened to the public;

1950: Designated a Wildlife Sanctuary; 1954: Assam Rhinoceros Preservation Act passed;

1969: First notification as a National Park; 1974: Final notification issued for a Park of 86,000 ha.

LAND TENURE

State, in Golaghat and Naogaon districts. Administered by the Assam Forest Department.

AREA

42,996 ha (UNESCO, 2010). About 5,174 ha were lost to erosion of the northern boundary by the Brahmaputra River leaving 37,822 ha within the Park (Lahan & Sonowal, 1973). The overlapping Kaziranga Tiger Reserve is 103,300 ha. National Parks totalling some 42,950 ha have been notified to the north, west and south. The last provides a corridor to the Karbi Anglong and Mikir Hills (+23,100 ha) (KNP,2003).

ALTITUDE

Ranges from 40m to 80m. South of the Park the Karbi Anglong and Mikir Hills rise to about 1,220m.

PHYSICAL FEATURES

The Park is 40 km long by 13 km wide. It lies in the flood plain of the Brahmaputra River, sloping very gradually from east to west against a backdrop of the foothills and snow-covered peaks of the eastern Himalayas. The riverine habitat consists primarily of dense tall grassland interspersed with open forests, interconnecting streams and numerous small flood-formed lakes or *bheels* which cover some 5% of its area. The whole Park can be flooded for 5-10 days, and three-quarters of the Baguri area in the west is submerged annually. A low range to the south, the Karbi-Anglang hills, provides a refuge in times of flood. The soils are alluvial (Spillett, 1966). The wetlands are described by Scott (1989).

CLIMATE

There are three seasons: summer, which is dry and windy, extends from mid-February to May with mean maximum and minimum temperatures of 37°C and 7°C. The monsoon occurs from June to September when conditions are hot and humid. Most of the mean annual rainfall of 2500mm falls during this season when the Park regularly floods. During winter, from November to March, conditions are mild and dry, when the mean extremes are 25°C and 5°C (Kushwaha & Unni, 1986).

VEGETATION

There are four main types of vegetation: alluvial inundated grasslands and reedbeds, alluvial savanna woodland, tropical moist mixed deciduous forests and tropical semi-evergreen forests (Talukdar, 1995). Based on Landsat data for 1986, the coverage by different vegetation types is: tall grasses 41%, short grasses 11%, open jungle 29%, rivers and water bodies 8%, sand 6% and swamps 4%, (Kushwaha & Unni, 1986).

Grasslands predominate in the west, with dense thickets of 5-6 meter tall elephant grasses on the higher ground and short grasses which provide good grazing on the lower ground around the *bheels*. These have been maintained and fertilised by annual flooding and controlled burning for thousands of years which has prevented the woodland from encroaching, and ensures a supply of grazing land. However, the occasional high floods can devastate the smaller fauna. Among the different high grass species, *Saccharum spontaneum*, *S. naranga*, *Imperata cylindrica*, *Erianthus* spp., *Arundo donax* and *Phragmites karka* predominate.

Among the grasses are numerous forbs and scattered trees of *Bombax ceiba* a dominant of savanna woodland, *Dillenia indica* in the swamp forest, *Careya arborea* and *Emblia officinalis*. The impenetrable semi-evergreen forests in the central and eastern areas are dominated by trees such as *Aphanamixis polystachya*, *Talauma hodgsonii*, *Dillenia indica*, *Garcinia tinctoria*, *Cinnamomum bejolghota*, *Ficus rumphii*, and species of *Syzygium*. In the tropical semi-evergreen forests common trees and shrubs are *Albizia procera*, *Duabanga grandiflora*, *Lagerstroemia speciosa*, *Crateva unilocularis*, *Sterculia urens*, *Grewia serrulata*, *Mallotus philippensis*, *Bridelia retusa*, *Aphania rubra*, *Leea indica* and *L. umbraculifera* (Jain & Sastry, 1983). There is a wide variety of aquatic flora along river-banks and in the numerous pools; the destructive invader water hyacinth *Eichhornia crassipes* is often cleared out by high floods.

FAUNA

The Park contains about 35 major mammal species, including 15 of India's threatened Schedule I species* below). It harbours the world's largest population of *Indian rhinoceros *Rhinoceros unicornis* (VU) - over 70% of the total (IUCN, 2010) - which increased from a few dozen in 1908 (Gee, 1964), to some 670 in 1972 (Lahan & Sonowal, 1973), 1,100 in 1988 (Martin & Vigne, 1989) and in 2003, despite some 200 losses to poaching in the 1990s, 1,552 (IUCN, 2003) to 2,048 in 2007 (Aaranyak, 2007). But 19 were reported killed in 2009 to March 2010 alone (Hance, 2010). * Bengal tiger *Panthera tigris tigris* (EN: 29* in 1972, 86 in 2,000, 38 in Kaziranga in 2010) is recovering numbers in this prey-rich habitat to the point of attacking adult rhinos. The area has the highest density of tigers in the world and is a source for the tiger populations of the region (Ahmed *et al.*, 2010; Aaranyak *et al.*, 2010). *Indian elephant *Elephas maximus* (EN), estimated at 430 in 1972 (Lahan & Sonowal, 1973) were said to number 1,100 in 1996 (Jackman, 1996) and 1,092 in 2004. The increasingly threatened population of *Ganges river dolphin *Platanista gangetica* (EN) in the Brahmaputra was estimated at 197 in 2005, with a putative total of 230-300. It was found densest in the reach passing and often flooding the site (Wakid, 2009)

Other mammals include a small population of *western hoolock gibbon *Hoolock hoolock* (EN), *capped langur *Trachypithecus pileatus* (VU), *bristly hare *Caprolagus hispidus* (EN: 101 wild individuals in the world, Kavitha, 2001), Indian crested porcupine *Hystrix indica*, *sloth bear *Melursus ursinus* (VU: 30*), hog badger *Arctonyx collaris*, Eurasian otter *Lutra lutra*, *leopard *P. pardus* (10), wild boar *Sus scrofa* (3,645), *swamp deer or barasingha *Cervus duvauceli* (VU: 756), sambar *Rusa unicolor* (VU) (358), hog deer *Axis porcinus*, Indian muntjac *Muntiacus muntjak* (100*), water buffalo *Bubalus arnee* (EN: 677) and *gaur *Bos gaurus* (VU: 30). Population estimates are based on the 1972 census (Lahan & Sonowal) and 1984 census, given in Choudhury (1987). Elephants and other animals migrate before the monsoon southwards into the Mikir Hills and beyond them to avoid the annual flooding of the National Park (Sinha, 1981). A preliminary list of mammals is given by Spillett (1966).

The Park lies within one of the world's Endemic Bird Areas and the avifauna comprises over 300 species (Choudhury, 1987). The numerous water bodies are rich reservoirs of food, including fish, and thousands of migratory birds, of over 100 species, visit the Park seasonally from as far away as Siberia, bar-headed goose *Anser indicus* in great numbers. Uncommon waterfowl species include Dalmatian pelican *Pelicanus crispus* (VU), a rookery of *spot-billed pelicans *Pelecanus philippensis* near Kaziranga village, white-bellied heron *Ardea insignis* (CR), black-necked stork *Ephippiorhynchus asiaticus*, *greater and lesser adjutant storks *Leptoptilos dubius* (EN) and **L. javanicus* (VU), lesser white-fronted goose *Anser erythropus* (VU), marbled teal *Marmoronetta angustirostris* (VU), Baer's pochard *Aythya baeri* (EN), Pallas's fish eagle *Haliaeetus leucoryphus* (VU), grey-headed fish-eagle *Icthyophaga ichthyetus*, swamp francolin *Francolinus gularis* (VU) and spotted greenshank *Tringa guttifer* (EN).

Other birds of interest include white-rumped and slender-billed vultures *Gyps bengalensis* (CR) and *Gyps tenuirostris* (CR), eastern imperial and greater spotted eagles *Aquila heliaca* (VU) and *A. clanga* (VU), crested serpent-eagle *Spilornis chela*, lesser kestrel *Falco naumanni* (VU), *Bengal florican *Houbaropsis bengalensis* (CR), Indian skimmer *Rhyncops albicollis* (VU), pale-capped pigeon *Columba punicea* (VU), green imperial pigeon *Ducula aenea*, perhaps 25-30 grey peacock-pheasant *Polyplectron bicalcaratum*, blackbreasted parrotbill *Paradoxornis flavirostris* (VU), *great pied hornbill *Buceros bicornis*, silver-breasted broadbill *Serilophus lunatus*, Jerdon's and white-throated bushchats *Saxicola jerdoni* and *S. insignis* (VU), marsh, Jerdon's and slender-billed babblers *Chrysomma altirostre* (VU) and *Pellorneum palustre* (VU), *Turdoides longirostris* (VU), striated and chestnut-capped babblers *Turdoides earlei* and *Timalia pileata*, and yellow weaver *Ploceus megarhynchus* (VU) (Scott, 1989; BirdLife International, 2004).

The reptilian fauna includes the common water monitor *Varanus salvator*, Indian rock python *Python molurus*, Indo-chinese spitting cobra *Naja naja* and king cobra *Ophiophagus hannah* (Spillett, 1966). The *bheels* are excellent fish nurseries for Brahmaputra fish.

CONSERVATION VALUE

Kaziranga is renowned as one of the finest and most picturesque wildlife refuges in southern Asia with a wide diversity of species and the largest undisturbed floodplain on the Brahmaputra (Spillett, 1966). It protects the world's largest Indian rhinoceros population, as well as many other threatened species. The site lies within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Eco-region, and is one of the world's Endemic Bird Areas

CULTURAL HERITAGE

Mikir tribesmen live in the neighbouring Karbi-Anglang hills to the south.

LOCAL HUMAN POPULATION

There are no villages inside the National Park but it is very densely bordered on three sides by human settlements and tea plantations. There are 39 villages within a 10 km radius of the Park, with a growing population estimated at 22,300 people in 1983-1984, most of them very poor subsistence farmers tempted by poverty to fish and poach wildlife in the Park (IUCN, 2001/2002).

VISITORS AND VISITOR FACILITIES

The interior of the Park is accessible outside the flood season (May to October), mostly on elephant-back, by 4WD vehicles or seen from watchtowers. Guides are mandatory and foot safaris are banned. There are seven tourist lodges in the Park, and a few watchtowers. Some 22,020 people visited the park in 1983-4, and 15,700 in 1997 (IUCN, 1997). With the lessening of political turmoil in Assam the

tourist potential of Kaziranga has begun to develop again. In 2001-2 there were 46,306 visitors (KNP, 2003). In 2003 an Elephant Festival was held and tourist companies were once more visiting the Park regularly.

SCIENTIFIC RESEARCH AND FACILITIES

The first extensive census of the wildlife was carried out in 1966 (Spillett, 1966), since when censuses have been conducted by the Forest Department in 1972, 1978 and 1984 (Choudhury, 1987), and large wild animals are periodically monitored. Other work includes preliminary status surveys of the rhinoceros (Laurie, 1978), Bengal florican (Ali *et al.*, 1985; Narayan *et al.*, 1989) and swamp deer (Telukdar, 1995) Using satellite imagery, changes in vegetation cover have been monitored for the period 1973-1986 (Kushwaha & Unni, 1986) and the suitability of the habitat for a number of important ungulates has been assessed (Parihar *et al.*, 1986). Recently the biodiversity and conservation research organisation Aaranyak, with the Assam Forest and Wildlife Department has begun to systematically survey and monitor the rhinoceros and tiger populations of Kaziranga, Manas and other northeastern Indian parks (Ahmed *et al.*, 2010; Aaranyak, 2005).

MANAGEMENT

Kaziranga was originally designated a reserved forest in 1908 with the object of preserving the rhinoceros and other large mammals. The killing of rhinoceros was made punishable by the Assam Rhinoceros Preservation Act of 1954, reinforced by the Biodiversity Conservation act of 2002. Twelve Acts have been passed to safeguard conservation of the Park's lands and animals. No rights or privileges to exploit forest produce are exercised. Limited grazing was permitted until the area was finally declared a National Park. Kaziranga has a long history of management and there is annual burning of the grasslands by wildlife staff (Lahan & Sonowal, 1973). Elevated flood refuges have been built since development along the highway has begun to block the animals' customary escape from flooding into the hills to the south, and because when they reach safety, they disturb village crops. A Centre for Wildlife Rehabilitation and Conservation has been set up by the Wildlife Trust of India and the Assam Forestry Department, which cares for the many animals orphaned and injured by floods. Monitoring is constant of erosion and siltation, flood trends, grassland habitat, animal populations, tourists and local attitudes to conservation.

There has been a series of ten-year management plans from 1981. The present plan runs from 2003-2 to 2012-3 and is supplemented by Annual Plans of Operation, but improved management, financial and technical support, and community strategy, awareness, education and involvement in planning were all still necessary (UNESCO, 2002). The government has proposed a 429,500 ha extension to incorporate a section of the Brahmaputra River within the Park which is to be handed over to the Park administration when ownership rights have been settled. In addition, some 3,200 ha in the southern highlands of Karbi Plateau have been purchased by the Forest Department, but the land has not yet been ceded by the local tribal administrative body (Choudhury, 1987). Fishing within the Park has recently been made illegal to prevent it from forming a front for more serious forms of poaching (IUCN, 2001). Compensation is paid for damage caused by the Park's animals, but not for fatalities. There is regular monitoring of all major wild animals, flooding, erosion and tourists. By 2008 the property was considered well managed but still subject to several threats: heavy poaching especially for rhino horn, roadkills on the national highway crossing the property, isolation from the broader ecosystem, interbreeding of wild buffalo with domesticated cattle, invasive species, and overgrazing (UNESCO, 2009).

MANAGEMENT CONSTRAINTS

Flooding, river erosion and migration resulted in the loss of some 5,000 ha of the Park between 1925 and 1986 (Kushwaha & Unni, 1986). This is to be balanced in the future by enlargement of the National Park in the north to include part of the Brahmaputra River. Severe losses to wildlife are sustained during heavy floods, as for example in 1973 and in 1988, when 70% of the park was submerged, causing the deaths of at least 38 rhinoceros, including 23 calves, 1,050 deer, 69 wild boar, three baby elephants, two tigers and numerous smaller species. In 1996 44 rhinoceros were killed by floods; raised earth bunds were subsequently provided as refuges during floods (Milne, 1997). The monsoon flooding of 2004 was said to be the worst for 50 years, with widespread loss of animals. Flooding may be occurring more often due to damage to the watershed upstream (Bradley Martin & Vigne, 1989).

A railway paralleling the road was cancelled in the 1980s (Choudhury, 1987) but National Highway 37 along the Park's southern boundary is becoming busier, interfering with animal migratory routes, and

there are plans to widen this to a four-lane highway. Many animals are killed by traffic while crossing the road to escape the water, 50 animals in 2002 alone (Anon., 2005a). The road encourages settlement on either side, thus widening the gap between the National Park and the Karbi Anglang hills to the south to which the seasonal flooding forces many animals to move during the rains. The crossing also leaves them vulnerable to hunting and reprisals from local villagers for crop damage, especially by elephants; hence the need to extend the Park to include higher ground to the south. At the same time, 300 people are killed every year by elephants, for which no government compensation is forthcoming, which fuels resentment against the Park (KNP, 2003).

Poaching and illegal fishing are heavy and the poverty of the dense population around the Park make controlling them very controversial. Poaching of rhinoceros for its horn by heavily armed hunters, sometimes in league with disaffected tribal people is profitable: a kill may net the hunter the equivalent of \$2,200, and horn can sell for \$33,200 a kilogram (Anon., 2005b). The rhino population growth rate was thought to have declined in the 1980's (Choudhury, 1987): since 1986 about 30 animals has been killed each year although numbers are now increasing despite losses from flooding and from the heavy poaching (Milne, 1997; IUCN, 2001; Anon, 2005b). Some 9-12 poachers are shot by staff every year and 60 were killed during the 1990s (Milne, 1997; IUCN, 2001). In 1996, Jackman reported the occurrence, with fatalities, of armed conflicts between poachers and staff. Uncontrolled tourism is also a problem. By 2002, poaching and encroachment were reported to be under better control, with adequate staff and resources with 143 anti-poaching camps and a centre for looking after orphaned and injured animals. Nevertheless, staff morale was low, payment of wages delayed and there were shortages of equipment and uniforms due to lack of funds, said to be held up at the level of the Regional government (IUCN, 2001). By 2008 however, funds were being delivered regularly and 55 eco-development communities had been established in villages neighbouring the property to build capacity, to promote sustainable development and improve the collection of intelligence about poaching. Despite this, 24 rhinos were poached in 2007 and 8 more in 2008. There were also reports in February 2009 of tigers being poisoned by villagers (UNESCO, 2009).

One other threat that has become a recurring maintenance problem is infestation by the alien mimosa weed, *Mimosa invisa* and *M. inermis*, both introduced via upstream farms. This has blanketed the native vegetation over about 5% of the Park and requires constant clearing. There is also some danger from pollution of the river by tea estates and a refinery upstream (Anon., 2005c). Stone quarrying in the adjacent hills has confined and disturbed the elephants which also come under threat where their migration corridors cross the road. Damage and fatalities caused by their rampaging have exacerbated popular opposition to the Park which local villagers continue to see as a traditional resource to which the government denies them access (EIA, 2005). Probably in retaliation, 40 elephants were poisoned in mid 2003. The illegal presence of grazing water buffalo contributes to the spread of rinderpest and has resulted in hybridisation of the wild stock. Community eco-development projects have been aimed more at the protection of animals and providing infrastructure than in helping communities directly, and there has been a lack of consultation and of an open planning process.

STAFF

There are some 452 staff as well as 242 Forest Protection Force personnel but this is still inadequate and over 100 posts were proposed in 2003 when there was a lack of technicians and of staff trained to deal with the complex social problems related to the surrounding population (KNP, 2003). Recently an additional 120 armed Home Guards with adequate rifles and ammunition were recruited and the phased recruitment of staff begun.

BUDGET

Funding comes from the Assam Government for development of National Parks and Wildlife Sanctuaries and from the Central Government's Project Elephant and Project Tiger, but is still not adequate. The Central Government allocated Rs3,683,000 (US\$283,000) for 1989/1990 under its rhinoceros conservation scheme and both national and state government continue fund the Park to control poaching and encroachments. In 1997, 1998 and in 2001, the WHF granted US\$100,000 Emergency Assistance towards the construction of guard posts and improved security. IFAW helped to fund the Centre for Wildlife Rehabilitation and Conservation and the U.S. Fish & Wildlife Service has granted US\$49,000 towards improved staff training. Since 2008 the UNF-funded World Heritage India programme has contributed towards management effectiveness, staff capacity building, the management involvement and sustainable development of local communities and raising conservation awareness (UNESCO, 2009).

LOCAL ADDRESS

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The principal source for the above information was the original nomination for World Heritage status.

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DATE

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