

World Heritage Sites

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CHITWAN NATIONAL PARK NEPAL

This Park with the adjacent Parsa Wildlife Reserve is the largest, longest protected, least disturbed and most studied of the sal forest communities of the Terai. The tall grasslands and riverine forest support a wild ungulate biomass and species diversity much higher than any other in the subcontinent. Rare species include tiger, gharial and the world's second largest population of Asian rhinoceros. The Himalayas provide a spectacular distant backdrop to a landscape much visited for its beauty

COUNTRY

Nepal

NAME

Chitwan National Park

NATURAL WORLD HERITAGE SITE

1984: Inscribed on the World Heritage List under Natural Criteria vii, ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

INTERNATIONAL DESIGNATION

2003: Beeshazar and Associated Lakes in the buffer zone designated a Wetland of International Importance under the Ramsar Convention (3,200 ha).

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Indus-Ganges Monsoon Forest (4.8.4)

GEOGRAPHICAL LOCATION

In south central Nepal on the Indian border, the core lying between the Narayani (Gandak) and Rapti rivers on the north and the Riju river and Indian border on the south, extending over the Sumesar and Churia hills; and from the Dawney hills west of the Narayani. Centred on 27°20'40"N by 83° 82'45"E.

DATES AND HISTORY OF ESTABLISHMENT

1846-1951: The area was protected as a royal hunting reserve;

1957: Wildlife Conservation Act 2015 passed to protect forest animals;

1964: A rhinoceros sanctuary demarcated south of the Rapti river, patrolled by Forest Dept guards;

1973: The Royal Chitwan National Park established (54,400 ha); 1974: regulations promulgated;

1977: Park enlarged to its present area;

1984: Parsa Wildlife Reserve established to its east;

1996: The buffer zone added (76,610 ha);

2011: National Park re-named.

LAND TENURE

State. Administered by the Management Committee of the Chitwan National Park under the Department of National Parks & Wildlife Conservation (DNPWC) of the Ministry of Forests & Soil Conservation.

AREA

93,200 ha. The buffer zone covers 76,610 ha. The adjoining Parsa Wildlife Reserve (49,000 ha) extends 50 km east. The Valmikinagar Wildlife Sanctuary (80,000 ha) in India adjoins the extreme southwest corner of the Park.

ALTITUDE

150 to 815m in the Churia Range.

PHYSICAL FEATURES

Chitwan is a basin in the Terai measuring approximately 100 by 40 km at its widest, lying between the pre-Himalayan Mahabharat Mountain range and the Siwalik belt of foothill ranges on the Indian border. The Park lies in the flood plains of the west-flowing Rapti and Riyu rivers, tributaries of the great Narayani river, and over the intervening Sumeshwar and Churia hills. Within the Park the wide valley of the Narayani extends northeast into the mountains. At its west end the river winds in a deep gorge between the Sumeshwar and Dawney hills to Gandak dam on the frontier, becomes the river Gandak and eventually joins the Ganges at Patna. The three lower ranges of the Siwalik Hills are of mid Miocene - early Pleistocene fluvial origin consisting mainly of the poorly consolidated detritus of sandstones, conglomerates, quartzites, phyllites, and outwash deposits from the severely eroded Tertiary rocks of the mountains further north. Their face towards India runs along the Main Frontal thrust fault that produces steep cliffs on south-facing slopes where vegetation cover is poorer than on northern slopes. The flood plains are a series of ascending alluvial river terraces raised by subsequent Himalayan uplift, composed of layers of boulders and gravels in a fine silty matrix graded roughly from boulders at higher elevations to gravels, sands, silt loams and silty clay loams (Bolton, 1975). Soils over the permeable sediments are poorly developed. The wetland heart of the Park, described by Scott (1989), forms the Inner Terai, an area little inhabited in the past because of malaria. It is savanna-like countryside with a magnificent background of snowy peaks.

CLIMATE

Conditions are subtropical with a summer monsoon from mid-May to late-September when 90% of the 2,400mm of rain falls. The monsoon causes dramatic floods which alter the courses and character of the rivers. Temperatures are highest, with a maximum of 38°C during this season, and drop to a minimum of 6°C after the monsoon when dry northerly winds from the Himalaya and Tibetan Plateau prevail, giving a relatively dry winter from October to February (Bolton, 1975; Laurie, 1978).

VEGETATION

The climax vegetation of the Inner Terai is sal *Shorea robusta* forest, which covers some 70% of the Park. Grasslands cover 20%, riverine forests 7% and mixed forest 3% (UNESCO/IUCN, 2005). Floods, fires and riverine erosion combine in a continually changing mosaic of savanna-like grasslands and riverine forests in various stages of succession. The purest stands of sal grow on the better drained soils of the lowlands around Kasra in the centre of the Park. Elsewhere, sal is intermingled with chir pine *Pinus roxburghii* along the southern face of the Churia Hills and with the trees *Terminalia belerica*, *Dalbergia latifolia* (VU), *Anogeissus latifolia*, *Dillenia indica* and *Garuga pinnata* on northern slopes. Creepers, such as *Bauhinia vahlii* and *Spatholobus parviflorus* are common but the understorey is scant except for grasses such as *Themeda villosa*. The mosaic of riverine forest and grasslands is maintained by seasonal flooding. Khair-sissoo *Acacia catechu-Dalbergia sissoo* associations predominate on recent flood-deposited alluvium and in less flooded lowlands, succeeded by semal-bhellar *Bombax ceiba-Trewia nudiflora*, with understorey shrubs *Callicarpa macrophylla*, *Clerodendrum viscosum* and *Phyllanthus emblica*. Two other riverine forest types, *Eugenia* woodland and tropical evergreen forest, occur outside the Park boundaries.

The Park has over 50 species of grasses. Laurie (1978) identified seven major grassland types: *Themeda villosa* which forms a tall grass cover in clearings in the sal forest, *Saccharum -Narenga*

associations growing as mixed and pure stands of tall grass, *Arundo-Phragmites* associations which form dense tall stands along stream beds on the floodplain and around lakes, *Imperata cylindrica* growing prolifically in areas of the park occupied by villages before their evacuation in 1964. Various short grasses and herbs grow on exposed sandbanks during the dry months which become much more prolific with the outset of rain in May, e.g. *Polygonum plebeium*, *Persicaria* spp., *Saccharum spontaneum*, one of the first species to colonise new sandbanks, and sedges *Cyperus*, *Kyllinga* and *Mariscus* spp. *Cynodon dactylon* and *Chrysopogon aciculatus* and other short grasses grow in the highest riparian areas all year.

FAUNA

56 species of mammals are recorded, 12 being threatened. The Park contained the last Nepalese population of the one-horned Asian rhinoceros *Rhinoceros unicornis* (VU) before its re-introduction to Royal Bardia National Park in 1986. This increased from about 300 in 1975 (Laurie, 1978) to 544 in 2000 but fell back to 372 by the 2005 count (WWF-Nepal, 2006), mainly due to poaching. This total is still quoted though twenty-four rhinos are said to have been poached since the last census was taken in 2008 (Hance, 2010). Bengal tigers *Panthera tigris* (EN) have been subject to study since 1974. The population was 46 in 1977 and in 1983 there were said to be 24-30 resident breeders at any one time (Smith *et al.*, 1983). But the population crashed in 1990 when half the resident tigers in the western section and two-thirds of their dependent young disappeared during the monsoon (McDougal, 1991). By 2000 the population had recovered to 112 (Shrestha, 2001) and by 2010 was estimated to be 125 (IUCN, 2010). The adjoining Parsa Wildlife Reserve was established to preserve Nepal's only reproducing wild elephant herd *Elephas maximus* (EN: 40-50 in 2007, Yadav, citing the Reserve Authority). They occasionally pass through the Churia Hills. The 50 or more elephants in the World Heritage site are domesticated. 7 Ganges river dolphins *Platanista gangetica* (EN) were recorded in 1980 (T.Maskey,pers.comm.) but the three populations in the Narayani river above the Gandak Barrage were extirpated following its construction (IUCN, 2010).

Other threatened mammals include Chinese pangolin *Manis pentadactyla* (EN), hispid hare *Caprolagus hispidus* (EN), wild dog *Cuon alpinus* (EN), sloth bear *Melursus ursinus* (VU: 50-60 in 1979), smooth-coated otter *Lutrogale perspicillata* (VU), fishing cat *Prionailurus viverrinus* (EN), sambar *Rusa unicolor* (VU) and gaur *Bos gaurus* (VU: 198) (Shrestha, 2001). Less threatened mammals include rhesus macaque *Macaca mulatta* and common langur *Presbytis entellus*, five-striped palm squirrel *Funambulus pennantii*, Indian crested porcupine *Hystrix indica* and Indian hare *Lepus nigricollis*, jackal *Canis aureus*, striped hyena *Hyaena hyaena*, Bengal fox *Vulpes bengalensis*, mongoose *Herpestes* spp., yellow-throated marten *Martes flavigula*, honey badger *Mellivora capensis*, spotted linsang *Prionodon pardicolor*, leopard *Panthera pardus* (120 in 2001), large and small Indian civets *Viverra zibetha* and *Viverricula indica*, masked palm civet *Paguma larvata* and common palm civet *Paradoxurus hermaphroditus*, leopard cat *P. bengalensis*, jungle cat *Felis chaus*, wild boar *Sus scrofa*, hog deer *Axis porcinus*, chital or Indian spotted deer *A. axis* and Indian muntjac *Muntiacus muntjak*. The wild ungulate biomass within riverine tall grass habitats has been estimated at 18,590 kgm/sq.km (Seidensticker, 1976), far higher than anywhere else in the Indian sub-continent. Most mammals found in the Park also occur in Parsa Wildlife Reserve on the southern slopes of the Churia Hills except for hog deer. The Reserve contains Indian wild dog (EN), nilgai *Boselaphus tragocamelus*, four-horned antelope *Tetracerus quadricornis* (VU), elephant (EN) and gaur (VU: >296, WWF, 2008)

A larger number of birds has been recorded in Chitwan than in any other protected area in Nepal: 565 species, 22 being threatened (Poudyal & Nepal, 2010). This is due to the Park's wide range of habitat types in a tropical lowland location where the distributions of eastern and western species overlap. It is also very important for some 160 wintering birds, both from beyond Nepal and altitudinal migrants which descend to the lowlands outside the breeding season, also passage migrants stopping over (Inskipp, 1989). Globally threatened species include slender-billed vulture *Gyps tenuirostris* (CR), white-rumped vulture *Gyps bengalensis* (CR), Indian spotted eagle *Aquila hastata* (VU), red-headed vulture *Sarcogyps calvus* (CR), Egyptian vulture *Neophron percnopterus* (EN), swamp francolin *Francolinus gularis* (VU), bengal florican *Houbaropsis bengalensis* (CR), gray-crowned Prinia *Prinia cinereocapilla* (VU), Jerdon's babbler *Chrysomma altirostre* (VU) and slender-billed babbler *Turdoides longirostris* (VU) are resident species. Greater and lesser adjutant storks *Leptoptilos dubius* (EN) and *L. javanicus* (VU), sarus crane *Grus antigone* (VU), greater spotted eagle *Aquila clanga* (VU), eastern imperial eagle *A. heliaca* (VU), Pallas's fish-eagle *Haliaeetus leucoryphus* (VU), lesser kestrel *Falco*

naumanni (VU) lesser florican *Syphoetides indica* (EN), white-throated bushchat *Saxicola insignis* (VU) and Indian skimmer *Rynchops albicollis* (VU) and bristled grassbird *Chaetornis striata* (VU) are rare visitors. A vagrant greater flamingo *Phoenicopterus ruber* was sighted in 2010 (Poudyal & Nepal, 2010).

For ten breeding species Nepal holds internationally significant populations. These include the Bengal florican (CR) and rufous-necked laughing-thrush *Garrulax ruficollis*. It is the only locality in the country for small buttonquail *Turnix sylvatica*, bristled grassbird (VU) and slender-billed babbler (VU). Chitwan is also the only protected area where the following species considered to be at risk in Nepal have been found: yellow bittern *Ixobrychus sinensis*, black baza *Aviceda leuphotes*, laggar falcon *Falco jugger*, blue quail *Coturnix chinensis*, thick-billed green pigeon *Treron curvirostra*, mountain imperial pigeon *Ducula badia*, vernal hanging-parrot *Loriculus vernalis*, chestnut-winged cuckoo *Clamator coromandus*, banded bay cuckoo *Cacomantis sonneratii*, tawny fish-owl *Ketupa flavipes*, ferruginous duck *Aythya nyroca*, silver-backed needletail *Hirundapus cochinchinensis*, blue-eared kingfisher *Alcedo meninting*, white-browed piculet *Sasia ochracea*, long-tailed broadbill *Psarisomus dalhousiae*, hooded pitta *Pitta sordida*, white-throated bulbul *Alofoixus flaveolus*, greater and lesser necklaced laughing-thrushes *Garrulax monileger* and *G. pectoralis*, ruby-cheeked sunbird *Anthreptes singalensis* and little spiderhunter *Arachnothera longirostra*. Details of the waterfowl are given by Scott (1989).

There are 47 reptile species in the Park (Shrestha, 2001), with some 19 species of snake including king cobra *Ophiophagus hannah* (VU), white-lipped tree viper *Cryptelytrops albolabris*, Indian python *Python molurus* and common krait *Bungarus caeruleus*. Other large reptiles are mugger *Crocodylus palustris* (VU) (200 in 1978 to 70 in 1988), gharial *Gavialis gangeticus* (CR) which is successfully bred locally, monitor lizards *Varanus* spp, also yellow-headed tortoise *Indotestudo elongata* (EN). Some 126 species of fish are recorded, including golden mahaseer *Tor putitora*, mahseer *T. tor*, *Barilius* spp. and *Puntius* spp. (Edds, 1986). There are also 155 species of butterflies (Shrestha, 2001). A detailed account of the Park's fauna is given by Gurung (1983).

CONSERVATION VALUE

This Park with the adjacent Parsa Wildlife Reserve are the largest, longest protected, least disturbed and most studied of the sal forest communities of the Terai. The tall grasslands and riverine forest support a wild ungulate biomass and species diversity much higher than any other in the subcontinent. Species include tiger, gharial and the world's second largest population of Indian rhinoceros. The distant Himalayas provide a spectacular backdrop to a landscape much visited for its beauty. The Park lies within a Conservation International-designated Conservation Hotspot and a WWF Global 200 Eco-region, and is adjoined by a small Ramsar wetland.

CULTURAL HERITAGE

There are two Hindu religious sites, Bikram Baba at Kasara and the Valmiki Ashram at Tribeni in the extreme southwest corner of the National Park. They are places of pilgrimage to both local people and visitors from India. The ancient Valmiki hermitage and surrounding temples commemorate the home of Valmiki, the revered author of the Sanskrit epic *Ramayana*. The Tharus, the main indigenous group, have lived in the area for centuries and are known to be immune from malaria. The other ethnic groups in the area are the Chhetri and Brahmin (Shrestha, 2001).

LOCAL HUMAN POPULATION

The Park was a royal hunting reserve until 1951. Between 1950 and 1960, after malaria was eradicated, the forests were cleared for settlement and agriculture and the human population of the Chitwan area rose dramatically from 36,000 to 100,000. After establishment of the Park in the former rhino sanctuary in 1964, some 4,000 inhabitants were relocated locally. The indigenous Tharus are mainly farmers but provide tourism-related activities such as local dance performances. However, since the 1950s they have been out-numbered by settlers from the hills who entered the Inner Terai following the eradication of malaria. By 1980 there were 261,300 people in 37 settlements around the Park, Sauraha being the largest (Milton & Binney, 1980; Mishra, 1982a). By 2003 the buffer zone population was 223,260 and there were 150,000 head of livestock (RCNP, 2003). By 2010, the population totalled 300,000 (IUCN, 2010). Forest products from the Park are still important to these people, and grasses are traditionally harvested for construction. Padampur Panchayat, to the south of the Rapti River, is a heavily populated area which also provides some of the last habitat for tiger, rhinoceros and gharial. The Madi valley in the southern buffer zone is cut off from electricity and roads

which would have to cross and divide the Park. Relatively few local people are involved in the profitable tourism business.

VISITORS AND VISITOR FACILITIES

Chitwan is one of Nepal's most popular tourist destinations outside Kathmandu and Pokhara. The first Jungle Lodge was set up in 1962. Foreign visitors increased from less than 1,000 in 1974 to 117,000 in 1999-2000, in addition to 30,000 local visitors. The Park headquarters is at Kasara, and Sauraha, the main gateway, has a good visitor information centre. Wildlife watching from elephant back and on elephant safaris, 4WD tours, canoe trips, fishing and birding are available and the Beeshazar lakes are only 10 km west of Sauraha. There are 7 luxury lodges within the Park: and two on its margins. There are over 70 low-budget lodges and guest houses outside the Park, mostly at Sauraha, with 1,800 beds. There are modest provisions for visitors in Parsa Wildlife Reserve. There are airstrips near Chitwan at Meghandi, near Parsa at Simara and an airport at Bharatpur 20 km north.

SCIENTIFIC RESEARCH AND FACILITIES

Chitwan is one of the best studied protected areas in the subcontinent and research on the natural history of the area has been an important contribution to understanding ecological systems in the Terai (IUCN, 1984). Since the 1970s, over 50 major independent research works have been completed on individual species and socio-economic subjects. Research into the ecology of the tiger and its prey species was initiated in 1973 by the Government, the Smithsonian Institution and WWF (Sunquist, 1981; Wemmer *et al.*, 1983), superseded in 1984 by the Smithsonian-Nepal Terai Ecology Project from a field station at Sauraha, where accommodation and facilities for scientists are available in the Biodiversity Conservation Centre. The Nepal Conservation Research Training Centre was established in the buffer zone in 1989 by the King Mahendra Trust for Nature Conservation, the DNPWC, Tribhuvan University and the Institute of Forestry and works closely with the Park authority. It has three focal areas: research, training and community forestry. The Trust monitors the site using these indicators: tigers by camera trapping; crop damage by wildlife, sloth bear count, bird count, grassland ecology and tourism studies. Tiger Tops Lodge also conducts a tiger monitoring program. There are established breeding centres for domestic elephants and gharial crocodiles and a breeding centre for turtles. The gharial breeding centre, funded by the Frankfurt Zoological Society, was established at Kasara Durbar in 1977. More than 200 young have been reared and re-introduced to the wild (Dhungel, 1987). Maskey studied the survival and dispersal of gharial released in the Narayani River.

The scope of the research covers broad aspects of ecology, including the relationships between habitats, invertebrate, vertebrate and human populations. These are described in project newsletters. McDougal (1977) studied the tiger in the west of the Park. The ecology of the Indian rhinoceros was studied by Laurie (1978, 1982) and by Dinerstein (1989). Other mammals studied include chital (Mishra, 1982b), hog deer (Dhungel, 1985) and muntjac (Oli, 1986). The avifauna is well documented (Gurung, 1983; Inskipp, 1989), with research including surveys of wetland species (Halliday, 1983). A gharial breeding centre, funded by the Frankfurt Zoological Society, was established at Kasara Durbar in 1977. More than 200 young have been reared and re-introduced to the wild (Dhungel, 1987). Maskey studied the survival and dispersal of gharial released in the Narayani River. The Aberdeen University Expedition to Nepal (1980) surveyed fish resources in the Narayani River system in relation to the endangered gharial population. Studies on grassland ecology have been carried out by Lemkuhl *et al.* (1988).

MANAGEMENT

Chitwan National Park is administered by a Management Committee under the Department of National Parks & Wildlife Conservation (DNPWC) of the Ministry of Forests & Soil Conservation. It was identified as the first conservation area in the Terai for its rich fauna, particularly the Indian rhinoceros which had been extirpated from its former range elsewhere in Nepal (Bolton, 1975). Development of the Park by the Forest Department began modestly in 1971, supplemented by a WWF grant. Conservation has been an outstanding success, much of it due to resettlement schemes and led to a substantial increase in wildlife populations with the regeneration of the vegetation along the Rapti River (Mishra, 1982). The management plan for 1975-79 was updated for 2001-2005, with three management zones. The establishment of Parsa Wildlife Reserve as an eastern extension to the Park increased the area under protection by about 60% and the whole area is now considered adequate to support the current wildlife populations. The WWF is encouraging the Terai Landscape Arc Project which seeks to create a single landscape of 49,500 square kilometers by connecting 11 bordering

protected areas in Nepal and India to help secure the survival of endangered species (WWF-Nepal, 2006).

Some 22,000 people were resettled from the Rapti area, including 4,000 from the former rhinoceros sanctuary, following the creation of a Land Settlement Commission in 1964. After a later study by the International Centre for Environmental Renewal, 7,000 people from 10 of the 16 villages in Padampur Panchayat on the eastern side of the park were resettled to more fertile lands with no wild herbivores (Milton & Binney, 1980). The scheme had local support but relocation of any of the other 310 villages surrounding the Park was not politically or economically feasible (Mishra, 1982a). The main concession to local people is the annual harvest of tall grasses, a valuable building material which is not readily available elsewhere in Nepal (Mishra, 1982). In 1987, an estimated 11,132 tonnes of grass were removed by 60,000 people during the 15-day grass-cutting period, valued at approximately NRs 9.9 million (US\$ 450,000). The opening of the Bhrikuti Paper Mill at nearby Gaidakot also introduced a new demand for grass. The net contribution of the Park to the local economy, after subtraction of labour and permit costs, is NRs 5.5 million (US\$ 250,000) (Lehmkuhl *et al.*, 1988). Because of Chitwan's importance as a tourist attraction, the Park authorities, with Peace Corps/Nepal, run an annual two-week training program for tour guides. Only guides who pass the course are licensed to work in the Park (Heinen, 1990). The area contains 37 Buffer Zone User Committees in 37 Village Development Committees. The Park contacts the villagers through these committees, holding monthly meetings with recognised community representatives to improve relations with the local people and give them economic incentives to support the Park. The program to benefit surrounding communities produced an income of \$US 2,500,000 between 1996 and 2003 (UNESCO/IUCN, 2005). Tourist numbers are high and with more than a third of entry fee revenues returned to the villagers in the buffer zone they are now beginning to create and manage tiger habitat and become their guardians instead of enemies (RCNP, 2003).

Management within the park is concerned with the levels of grassland harvesting, and burning to control vegetation. In the wetlands, the main activities are clearing weeds and removal of silt from ponds. Development and maintenance activities focus on combating poaching, which is a major and very time consuming challenge. Regular wildlife monitoring is also important, particularly through the tiger and rhino censuses. There is a rhino translocation program to help maintain populations in other local parks with 67 rhinos translocated between 1986 and 2000. Wounded and problem animals are captured and treated but management of man-eating tigers is difficult. There are 50 + elephants in the park, including those in the breeding centre which are mainly used for tourism, park protection, research and monitoring and for managing problem animals (Shrestha, 2001).

MANAGEMENT CONSTRAINTS

In 1990 the Park was threatened by a proposed hydroelectric barrage on the Narayani River upstream, and the East Rapti Irrigation Project, which would reduce the river's base flow by 75%. Both projects would result in changes to the riverine ecosystems which could seriously affect aquatic and terrestrial fauna (Sharma, 1990; Anon., 1991). In an assessment of the irrigation project for the Asian Development Bank in 1991, Talbot concluded that environmental risks from the project were unacceptably high and recommended that it be reformulated or replaced by one or more lower-cost projects. Regulation of this pollution is urgently needed: in 2003 nine major mills and distilleries still discharged effluent into the Narayani river, the exotic water hyacinth *lornia spp.* is choking up waterways and the summer flooding of the Rapti river is an annual hazard. Fishing of the bordering rivers, poaching during the *Dasain* festival and the influx of three annual pilgrimages have all been intensified by the increase in population.

Antagonism has long existed between the Park and local people, particularly residents of Padampur Panchayat within the core and those of the Madi valley, cut off from services in the south. The first, a village of 11,208 people has now been relocated north of the Park. The main areas of conflict are the loss of life to wild animals (three to five people are killed each year by rhinoceros and tiger), losses of livestock where domestic cattle form a third of tiger kills in areas round the Park, year-round damage to crops estimated between 10% to 100%, and restrictions on the use of the Park's forest resources. Hunting, fishing, grazing, and collection of timber, fuelwood and other forest products for food and medicine are prohibited within the Park (Milton & Binney, 1980; Mishra, 1982). However, poaching of both rhinoceroses and tigers is continuous because their parts bring so high a price: in 2009 rhino horn was worth one-and-a-half the price of gold (Hance, 2010). And as former grassland is reforested, the increase of suitable habitat attracts more tigers into conflict with grass-gatherers and hunters.

Sixteen people were killed by tigers in and around the park between October 1980 and early 1989 (McDougal, 1989). Such conflicts will escalate as the local human population continues to increase and the areas of unprotected remnant forest and grassland decline. The Park's authorities are trying to resolve them, and local people are beginning to appreciate the value of managed natural resources (Lehmkuhl *et al.*, 1988). The years of insurgency between 1996 and 2007 forced the army to withdraw soldiers from park guard duties, with the resulting deaths of many rhinoceros for their horns, and because they damaged crops.

Illegal collection of fuelwood during the grass-cutting season is a hindrance to the proper management of the program and must eventually be resolved by establishing community fuelwood plantations around the Park (Lehmkuhl *et al.*, 1988), already successful at Baghmara (UNESCO/ IUCN, 2005). The collection of tall grasses is well controlled but has inevitably led to changes in the floral composition of the grassland communities. The cutting period has now been reduced to 3 days for easier management. Annual burning seems to maintain the grasslands but semal *Bombax ceiba*, the only fire resistant tree, is encroaching on this habitat (Troth, 1976). Overgrazing along Padampur Panchayat's riverine boundary seriously accelerated the already extensive erosion of the river bank and consequent loss of valuable crop lands. Meanwhile, the pressure of tourism is having negative impacts. The development of tourist hotels and teashops on the eastern side of the Park has not been controlled. The rapid increase in the number of foreigners visiting Chitwan has led to locally inflated prices for basic foods and household goods. These problems are compounded by the employment of relatively few local people in the Park so that the local population is poorer as a result of its presence (Mishra, 1982), although more recently, nearby villagers have received up to 50% of park-generated revenues (Milne, 1997).

STAFF

The original staff totalled 278 but is considered inadequate. Under the Chief Warden and assistant wardens there are 79 game scouts, and 128 elephant keepers deployed in 4 sectors with 37 guard posts, 11 being supervised by the Royal Nepal Army: since 1973 a battalion (of 331 soldiers in 2005 during the civil unrest) has been stationed at the Park Headquarters at Kasara, and in and around the Park for enforcement duties (UNESCO/IUCN, 2005; RCNP, 2003). More staff and training are needed to allow the game scouts to work in the buffer zone as effectively as in the Park itself.

BUDGET

In 1989-90 expenditure was NR2,447,353 (US\$81,578) and income NR13,449,910 (US\$448,330). Income was derived from entrance and camping fees (65.4%), elephant rides (14.4%), hotel concessions (12.2%), grass-cutting permits (2.3%) and other sources (5.6%). The budget for 1990/1991 was NR 2,970,000 (US\$ 99,000). In 2001-02 Government funding for the Park was about US\$180,000, administration accounting for 60-84%. This was still considered inadequate. Major donors include UNDP-GEF which in 2001 granted \$US80,000 for management planning, equipment and training, Save the Tiger Fund, WWF, UNF, ADB, the Smithsonian Institute, and the US National Fish & Wildlife Foundation. US\$104,000 was contributed towards a UNESCO/IUCN project budget between 2001 and 2004. The seven lodge concessionaires in the Park are taxed and a conservation fee donated by them forms an endowment for emergency conservation activities. In the early 2000s, the Management Committee and 21 user committees received 30-50% of park revenues for conservation and local community development activities (RCNP, 2003).

LOCAL ADDRESSES

The Chief Warden, Chitwan National Park Headquarters, Kasra Durbar, Narayani Zone, Nepal.

The Director, Chitwan National Park, Department of National Parks & Wildlife Conservation, Babar Mahal, GPO Box, 860, Kathmandu, Nepal.

WWF Nepal Programme Office, Baluwatar, Post Box 7660, Kathmandu, Nepal.

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