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# THE GREATER ONE-HORNED RHINO OF ASSAM IS THREATENED BY POACHERS

Lucy Vigne and Esmond Bradley Martin

WWF Regional Office, PO Box 62440, Nairobi, Kenya

## INTRODUCTION

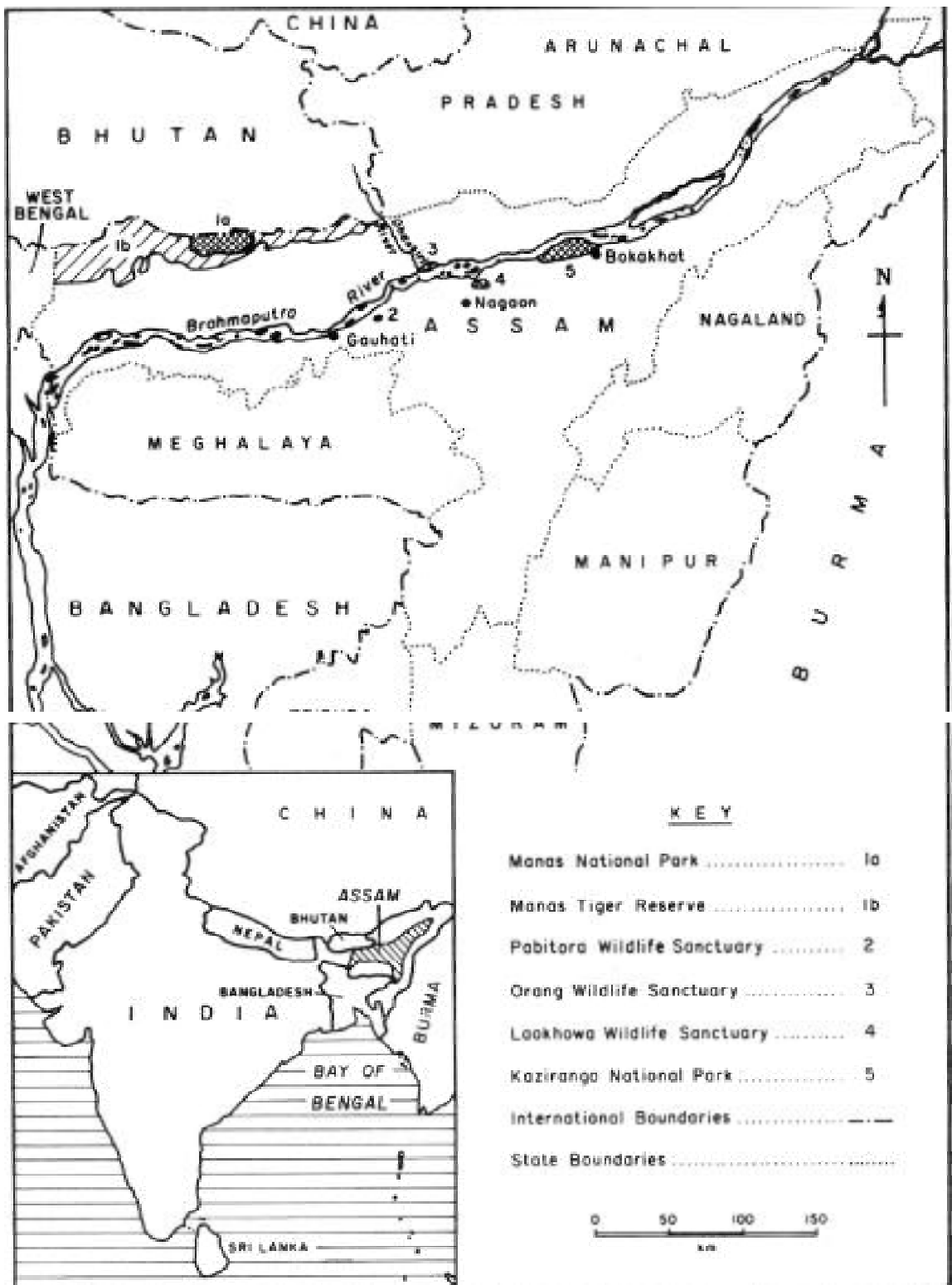
Assam in north-east India (see map) was once home to all three species of Asian rhinos. They inhabited most of the floodplain of the Indogangetic and Brahmaputra riverine tracts and the neighbouring foothills. Human settlement, habitat destruction for crops and hunting, however, led to the killing and loss of almost all of the rhinos by the start of the 20th century. While two of the rhino species disappeared in this region, *Rhinoceros unicornis* survived in a few small pockets and with protection from the early 20th century, their numbers gradually rose in Assam to the present number of about 1,450 (see Table 1) in 1993

despite the rhino's slow breeding rate. Assam's protection of its greater one-horned (or Indian) rhinos has been one of the great rhino success stories. An estimated 75% of the total number of this species now exists in this one small state of India. Recent funding cut-backs and political disturbances, however, led to increased poaching in 1992 and 1993, causing concern for the future of the rhino in this poor and backward state (see Tables 2, 3 and 4). S. Deb Roy, formerly Chief Conservator of Forests (Wildlife) Assam and formerly Inspector General of Forests (Wildlife) Government of India, believes that the challenge of saving the rhinos is probably much more intense at present than at any earlier time (Deb Roy, 1993).

Photo credit: Lucy Vigne



*Greater one-horned rhinos may be very closely approached on elephant-back in Assam.*



Map of Assam.

Table 1: Estimated wild populations of the greater one-horned rhino in India in 1993.

ASSAM		WEST BENGAL		UTTAR PRADESH	
Kaziranga National Park	1164	Jaldapara Wildlife Sanctuary	34	Dudhwa National Park	12
Manas National Park	60?	Garomara Wildlife Sanctuary	13		
Orang Wildlife Sanctuary	100				
Pabitora Wildlife Sanctuary	56				
Laokhowa Wildlife Sanctuary	5				
Other pockets	60				
Sub Total	1445	Sub Total	47	Sub Total	12
Total for India	1504				

Source: Forest Departments of Assam and West Bengal

Photo credit: Lucy Vigne



Kaziranga National Park provides excellent habitat for the greater one-horned rhinos.

Table 2: Number of known rhinos poached in Kaziranga and Manas.

YEAR	KAZIRANGA NATIONAL PARK	MANAS NATIONAL PARK
1962	-	1
1963	-	1
1964	-	0
1965	18	1
1966	6	0
1967	12	0
1968	9	0
1969	8	0
1970	2	0
1971	8	1
1972	0	0
1973	3	0
1974	3	0
1975	5	0
1976	1	4
1977	0	0
1978	5	1
1979	2	5
1980	11	0
1981	24	2
1982	25	1
1983	37	3
1984	28	4
1985	44	1
1986	45	1
1987	23	7
1988	24	1
1989	44	6
1990	35	2
1991	23	3
1992	49	11
1993	40	22
<b>Total</b>	<b>534</b>	<b>78</b>

Source: Forest Department of Assam

Table 3: Number of known rhinos poached elsewhere in Assam.

YEAR	ORANG WILDLIFE SANCTUARY	PABITORA WILDLIFE SANCTUARY	LAOKHOWA WILDLIFE SANCTUARY	OTHER AREAS IN ASSAM
1979	2	0	6	0
1980	3	0	1	3
1981	2	0	6	4
1982	5	0	5	8
1983	4	0	40	7
1984	3	4	0	6
1985	8	2	0	1
1986	3	0	0	4
1987	4	2	0	7
1988	5	4	1	9
1989	3	3	3	8
1990	0	2	0	6
1991	1	1	0	1
1992	2	3	0	2
1993	1	4	0	3
<b>Total</b>	<b>46</b>	<b>25</b>	<b>62</b>	<b>69</b>

Source: Forest Department of Assam

Table 4: Number of known rhinos poached in Assam from 1979 to 1993.

YEAR	NUMBER OF RHINOS POACHED
1979	15
1980	18
1981	38
1982	44
1983	91
1984	45
1985	56
1986	53
1987	43
1988	44
1989	67
1990	45
1991	29
1992	67
1993	70
<b>Total</b>	<b>725</b>

Source: Forest Department of Assam

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## KAZIRANGA NATIONAL PARK

### Introduction

The first area in Assam gazetted for rhino protection was Kaziranga (see map) in 1908. At this time there were believed to be only a dozen or so Indian rhinos left there, but rhino numbers have now risen to an estimated 1,164 (see Table 5). The 430 km<sup>2</sup> of Kaziranga is ideal rhino habitat as two-thirds of the area is nutrient-rich grassland (Forest Department of Assam, 1993). As a result of its size and high carrying capacity, Kaziranga holds more rhinos than any other park or sanctuary in Asia.

### Poaching, the illegal rhino horn trade, and anti-poaching needs

Poachers can enter Kaziranga easily as there is no natural barrier on the southern boundary of the Park. On the northern side, the two kilometre-wide Brahmaputra river acts as the boundary. Fishermen are allowed to fish there, however, even at night and sometimes they bring in

rifles (.303s and .315s) secretly and collude with illegal hunters. Most of the rhinos are killed with guns (see Table 6). Poaching gangs consist of around four to six people: two may carry guns, one cuts off the horn and perhaps another helper carries some food; there is also a field man, usually a local villager, who guides the gang in and out of the Park. The poachers are mainly Nagas (originally from Nagaland State), immigrants

Table 5: Number of rhinos in Kaziranga National Park.

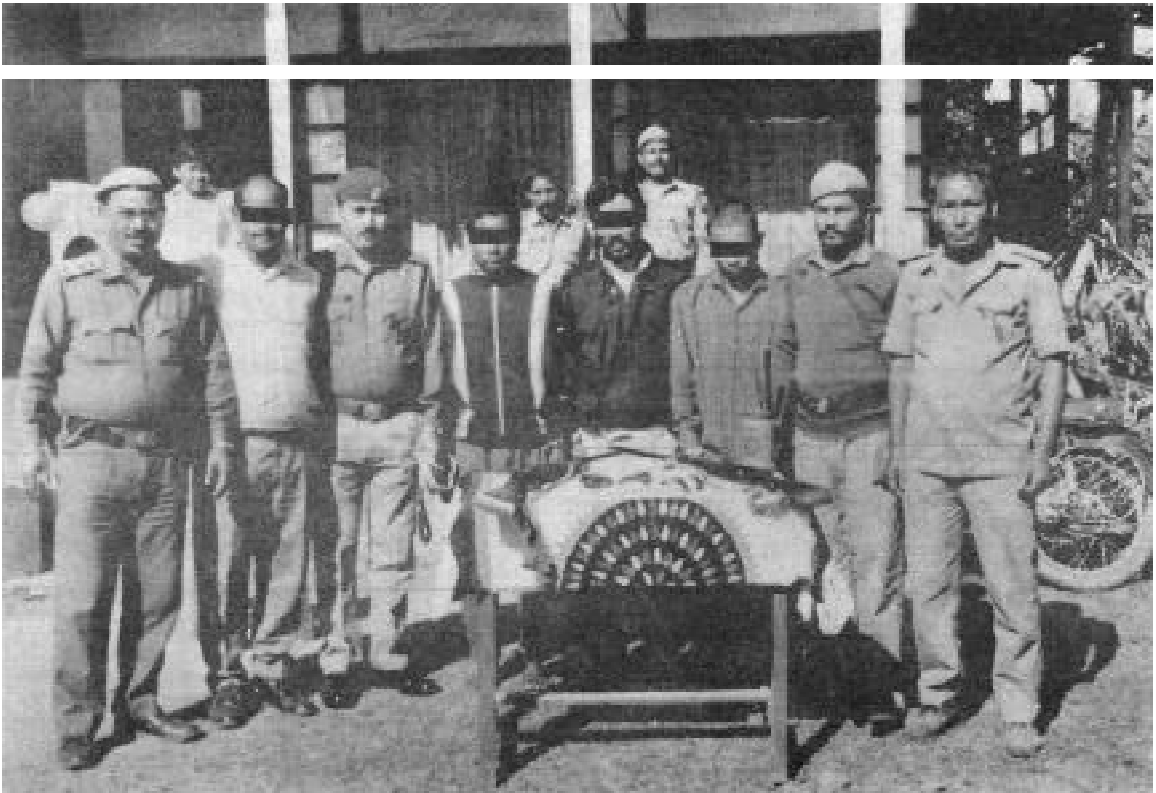
YEAR	NUMBER	COMMENT
1966	366	Census
1972	658	Census
1978	939	Census
1984	1080	Census
1991	1129	Census
1993	1164	Census

Source: Forest Department of Assam

Photo credit: Lucy Vigne



Poachers kill rhinos indiscriminately, often shooting the calf as well as the mother for the horn.



*Government personnel are photographed with several poachers in Bokakhat next to Kaziranga National Park in December 1992. On the table are displayed two rifles and 13 rounds of ammunition which were confiscated from the poachers.*

from Bangladesh and the Karbi tribe from the Karbi Anglong Hills on the southern side of the Park. They often enter the Park when it is dark. The poachers are indiscriminate, killing whatever rhinos they find first, including calves. They take the animal's horn, and occasionally the nails and tail. There is no time to take the meat. The gangs usually do not camp inside the Park because it is too risky and, after shooting a rhino, quickly leave with the horn.

There is a total of 437 field staff in Kaziranga, all engaged in anti-poaching work. About 284 forest guards and game watchers carry out foot patrols in rota in the Park during the day and night, usually in pairs, equipped with a gun and torch. Poachers are, however, rarely caught inside the Park, as it is easy to hide in long grass or forests.

There has been an increased availability of modern guns in Assam due to the political disturbances in the state, and thus pit poaching has become less common in Kaziranga since 1987 (see Table 6). Until 1980 most of the rhinos in Kaziranga were poached using pit traps,

whereby a rhino falls into a deep pit dug in a rhino's regular pathway (Martin, 1983). However, one pit poaching incident did occur in Kaziranga as recently as September 1993. This rhino must have fallen into a triangular pit, which had been covered with leaves, and the animal had its horn removed while it was still alive, and died later of starvation. Electrocuting from wires hooked to a power line (which runs along the Park's southern side) is another problem. This form of poaching was first seen in 1989 when three rhinos were killed in that year from the live wires which were suspended over the rhinos' pathways. Forest guards now patrol along the power line at night, thus reducing poaching by this method (see Table 6).

Poaching is most frequent during the dry season, in the first few months of the year, when every part of the Park is accessible. An organizer provides the guns and pays the shooters about \$320 (10,000 rupees) to \$640 and the others in the gang up to \$320 each for one horn weighing on average 722 grams; poachers are not usually paid by horn weight. Thus the average poaching gang received in 1993 the equivalent of \$1,550 to \$2,220

per kilo of rhino horn. The organizer sells the horn to the second trader for about \$6,008 to \$12,800 per kilo.

Poaching reached a peak in Kaziranga in 1992 with two rhinos killed in pits, two by electrocution and 45 by gunshots (see Table 6). This serious killing continued in 1993: 39 rhinos had been poached by early December, with 37 killed with guns and two in pits. The western sector of the Park has the greatest concentration of

rhinos, numbering over 600, and poaching in 1993 was acute here. For example, in February 1993 a villager guided three Naga poachers into this sector. When the gang came out of the Park an encounter took place with Park authorities. However, the forest guards are not allowed to kill poachers outside the Park. The guards instead wounded one person. The Nagas ran into the hills in the chaos and the local guide, who was holding the horn, took it to sell in the Nagaon area.

Table 6: Rhino mortality in Kaziranga National Park.

Year	Poaching			Total poaching	Natural death	Total mortality
	Pit	Gun	Electrocution			
1980	11	0	0	11	58	69
1981	22	2	0	24	39	63
1982	19	6	0	25	48	73
1983	31	6	0	37	46	83
1984	14	14	0	28	5	78
1985	23	21	0	44	37	81
1986	18	27	0	45	38	83
1987	6	17	0	23	41	64
1988	7	17	0	24	105	129
1989	12	29	3	44	54	98
1990	4	29	2	35	57	92
1991	4	18	1	23	79	102
1992	2	45	2	49	66	15
1993	2	37	0	39	54	93 (to 12 Nov)

Source: Sen 1993

Table 7: Encounters and raids in Kaziranga National Park.

Year	Number of poachers		Total arms recovered	Total ammunition recovered	Horns recovered
	Killed	Arrested			
1985	2	10	3	11	11
1986	2	43	5	0	9
1987	3	29	3	0	2
1988	3	13	1	7	1
1989	2	18	1	0	11
1990	3	49	11	104	6
1991	4	25	4	7	9
1992	9	58	9	96	9
1993	5	67	11	49	4

Source: Sen 1993



*Rhino horns, which are recovered from poachers or from animals which die of natural causes, are registered at the Park headquarters before being transferred in locked containers to the state treasuries.*

Police recovered four .315 guns and ammunition and arrested some people involved. They were released after only one-and-a-half months' imprisonment.

The most common way poachers are caught is through an informer. Although there is now virtually no money for an intelligence system, nor for informants, information does sometimes trickle in. During our visit, on 16 December 1993 a raid was conducted in the Karbi Anglong Hills by the Forest Department along with the police. These hills are a favourite refuge for poachers and guns as most areas cannot be approached by vehicle. The guns are all illegal, and come mainly from Nagaland, Burma and Bangladesh. Six people were arrested in possession of a US-made carbine, a 12-bore shotgun and a handmade pistol. The leader, a Bodo tribesman, escaped. He is known to have killed two rhinos in 1993. Such poachers, when caught, usually get bail after only about 15 days and do not go to prison for this particular incident again. Bail costs \$160 to \$320 and the advocates, who are often hired by the gang organizers, manage to spin out the court hearings for years. It is very difficult to prove legally that a person has killed a rhino. Furthermore, information extracted by force is not accepted by a magistrate.

Although, according to the Wildlife (Protection) Act 1972, a convicted poacher can get five years in prison, this never happens. Worse still, the traders are very rarely caught, although many names are known. In 1989 two people were apprehended carrying two rhino horns on a bus, but there has been no conviction yet. In practice, the law is not a deterrent to poaching. The real deterrent is the knowledge that poachers will be shot on sight in the Park (at least five were killed in 1993) or beaten up outside the Park in order to give information to the Forest Department (see Table 7).

In 1989, a well-known trader was murdered by the United Liberation Front of Assam (ULFA), a political organization which during its early days tried to protect the rhinos (Vigne & Martin, 1991). Although this illegal group of extremists has an official policy of not killing rhinos due to local pride in rhinos, there is evidence that certain members in the group have been involved recently in poaching and trading rhino horns in order to buy guns from Bangladesh and Burma. ULFA is less strong now, however, as some major arrests were made by the government and some members have surrendered.





Mr. S.K. Sen, Director of Kaziranga National Park inspects a forest guard camp on the northern boundary of the Park. Due to recent shortages of funds, the camp is in a state of disrepair. Plastic sheeting covers the leaking roof.

Poaching has definitely increased recently, and efforts must be made by the Police outside Kaziranga to break the trade links. The rhino horns are smuggled out through Calcutta, Siliguri in West Bengal, Nagaland, Burma and Bhutan; but details are not known as there is no money for an effective intelligence network.

More funding is urgently needed for Kaziranga's anti-poaching efforts. Presently there are inadequate wireless networks for the forest guards in the field. A further essential is for more modern guns. At present, Kaziranga has 170 .315 rifles and 47 12-bore shot guns, but not all are in working order. It has been suggested by an Army officer (WWF, 1993) that ex-servicemen should train the forest guards in the use of weapons, minor tactics and field-craft, including ambushes, and teach them how to maintain their guns and radio sets. The forest guards are presently no match for the poaching gangs.

The morale of the forest guards must be raised by improving their terms of service. They need new jerseys, boots, socks, raincoats, torches, knives and binoculars, as well as tents. Several men we saw on patrol were wearing tattered clothes and were barefoot. They should also be provided with free rations, especially since they have to run two households as their families have to live outside the Park. The camps are in disrepair and should have proper mosquito nets, blankets and tarpaulins for the leaking roofs. The staff need better medical facilities. Medicine and also a good veterinarian should be available for the 43 domesticated elephants in the Park.

Furthermore, the number of forest guards must be increased. Presently there are only three men per camp (there are 107 to 113 camps, all inside the Park). Two men patrol together all night and the third cooks and cleans leaving them barely time to sleep; in theory they are on duty 24 hours a day and are usually exhausted. Ideally there should be four men per camp allowing more time for rest. Out of the 437 field staff, at least 10% will be off sick and at least 10% on casual leave; the Director of Kaziranga, S.K. Sen, cannot afford to give them their much needed month's annual leave. Furthermore, life insurance cover plus adequate compensation for loss of life or disability should be provided by the government. Courageous work should be rewarded with 'decorations' leading to promotions (Deb Roy, 1993). The field staff on the whole are very good and hard-working and many have a great knowledge about rhinos, but they must be given respect and must have pride in doing their jobs; some of the men in the camps we visited complained to the Director about their poor working conditions and looked miserable. The Director's reply to their requests for rice and clothes was, "I will try". The field men are nevertheless dedicated and work diligently on patrol; but how much longer can this last as poaching gangs become more active?

The Director of Kaziranga believes that the best way to stop the poachers is to prevent them from entering the Park. The Director would like to build a minimum of 40 watch-towers along the southern Park boundary with

clear visibility from one tower to the next. A timber tower, 12 metres high, would cost about \$1,130. Surveillance towers would help to reduce the workload of the staff. On the northern boundary several speed-boats are needed for patrolling. Also, more jeeps (the Park has only five) and search-lights are required.

Probably the most cost-effective way of stopping the illegal rhino horn trade is by providing adequate funds for an intelligence network whereby informers are rewarded for their information. At present, funds for this are grossly inadequate; a mere \$1,450 was available for 1993. The Forest Department also needs more support from the police for law enforcement, as Forest staff can do little to stop poachers and traders beyond the Park boundaries.

## Park maintenance and development requirements

Burning the dead, tall grass has always been the main management tool, enabling new shoots to grow and thus maintaining the grassland ecosystem. About 35% of the Park area is burned annually (Lahan, 1993). This requires little money. The creation of more highland for the rhinos is another requirement. During the monsoon, most of the Park is under water from the flooded Brahmaputra. In 1988 the flood was **so bad that 46 rhinos** died (Deb Roy, 1993). With increasing human settlement outside the Park on the

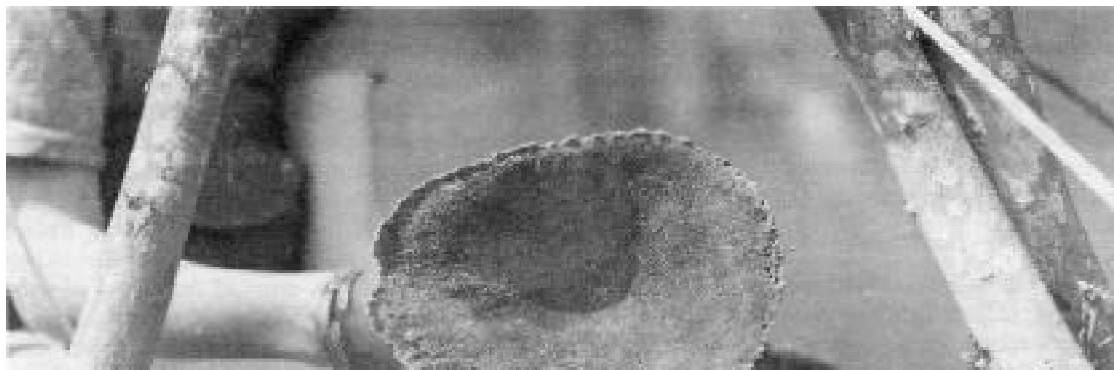
higher land, rhinos have nowhere to take refuge. Furthermore, road communication is reduced in the Park during the floods. Thus, raising the main roads would allow access to patrol vehicles during the rains and produce high ground for the animals. Bridges also must be maintained for mobility within the Park. During our visit these were collapsing, having remained unrepaired since the last flood due to lack of funds. In addition, many of the bodies of water need to be de-silted and cleared of exotic weeds, particularly water hyacinth, in order to improve the grasses, the main food for the rhinos.

There are seven Park extensions that have been agreed upon, six on the southern side, including highland areas, and one on the north, namely the Brahmaputra river section beside the Park and the islands within it, which will be a great asset in preventing fishermen from aiding poachers. Although some money has been paid, more funds are needed to complete the transaction. When finalized, the Park area will be 91 7 km<sup>2</sup> as opposed to the existing 430 km<sup>2</sup> (Lahan, 1993; Sen, 1993). A further improvement which will indirectly help the Park concerns assistance to the villagers on the Park fringes with development projects. The human population pressure around the Park has much increased. The number of people in North Bengal and Assam has more than doubled since Independence (Deb Roy, 1993). Although some people consider rhinos as an asset because of the revenue earned from tourism, others, especially many of the Bengali immigrants, do not like

Photo credit: Lucy Vigne



*Kaziranga National Park needs much maintenance and development including (as shown -here in 1986) raising some roads to provide areas of highland for animals during floods.*



*The spongy, honey-comb-like appearance on the under-side of the horn from the greater one-horned rhino makes it difficult to produce realistic fake horns.*

the Park as they get no legal benefits from it: no thatch, timber, firewood nor fish may be taken. There are too many restrictions on the local people which increase their antagonism towards the Park.

An ecological development programme was recently proposed by WWF India (WWF India, 1993). A main recommendation is to help more people get employment. Some casuals are at present employed in the Park at \$0.80 a day. Much more Park work is needed, which would help both Kaziranga and the villagers, if more money could be provided. The villagers also require tube-wells for clean water, proper medical facilities, education to improve conservation awareness, community afforestation projects and assistance to prevent crop losses. Crop damage, particularly by elephants, rhinos, buffaloes and wild boar, is the main cause of antagonism between the Park and the villagers. There is no compensation paid, unlike in the neighbouring state of West Bengal, but it should be, according to the Director of Kaziranga, who estimates that rhinos alone cause more than \$3,200 of damage a year. The Forest Department assists an underpaid and under-equipped 'crop protection squad', which needs to be improved (WWF India, 1993). If some villagers continue to suffer losses (including deaths from wild animals), and at the same time receive no legal benefits from the Park, they will be encouraged to harbour poachers. The Director of Kaziranga wants the fringe villagers to be the Park's second line of defence against

poachers. The villagers' support is absolutely essential to reduce poaching of the rhinos.

## **MANAS NATIONAL PARK**

### **Introduction**

Manas was gazetted a Wildlife Sanctuary in 1928 and elevated to the status of a National Park in 1990. The Park is 500 km<sup>2</sup> in size, running in a strip along the Bhutan/Assam border (see map). Only the southern boundary is close to villages; a buffer zone consisting of adjacent reserve forests extends the area to 2,837 km<sup>2</sup> in India plus an additional 439 km<sup>2</sup> of National Park, also called Manas, in Bhutan (Lahan, 1993). There are more than 20 endangered species in Manas and several are endemic, including the golden langur and pygmy hog. Manas became a Tiger Reserve in 1974 and a World Heritage Site in 1985. In 1990, Manas had 85 to 100 rhinos (see Table 8), although it could sustain 200 to 300, according to S.C. Dey, Director of Wildlife Preservation for the Government of India (pers. comm.). About two-thirds of the Park is ideal habitat for the species (Deb Roy, 1991). However, R.N. Hazarika, Chief Conservator of Forests (Wildlife) for Assam, fears rhino numbers could have halved since the 1990 estimate due to a great increase in poaching (pers. comm.). Officially, for 1993 the number of rhinos remaining is 60, a figure

Table 8: Number of rhinos in Manas National Park.

Year	Number	Source
1966	15	Estimate by Gee and quoted by Spillett (1966)
1976	40	Estimate by A. Laurie (1978)
1986	75—80	Estimate by Assam Forest Dept.
1989	85	Estimate by Assam Forest Dept.
1990	85—100	Estimate by Assam Forest Dept.
1992	80	Estimate by Assam Forest Dept.
1993	60	Estimate by Lahan, Director of Manas Park

which is not obtained from a census but is an estimate by the Park Director, P. Lahan. Personnel from a WWF project in Bhutan's Manas Park (where no rhinos are resident) have noticed that rhinos crossing over at night into Bhutan for grasses and minerals (and returning to the Indian side in the morning) have declined in number sharply from early 1992 to late 1993 (pers. comm.). No rhino carcasses have been found in Bhutan, however, although Indians do come across to poach deer and take timber illegally.

## Rhino poaching

Since 1987, the All Bodo Students' Union has been demanding from the government a separate state of Bodoland, which would encompass Manas. The leaders want their own state in order to protect their culture, language and identity. In 1989, political strife increased; Bodo tribal terrorists killed over 100 villagers and invaded Manas, killing three wildlife employees. The Sanctuary became a Bodo refuge and 120 forest guards had to be removed until the agitation stopped (Vigne & Martin 1991). Manas has continued to be a hide-out for Bodos, who can easily escape from there into Bhutan. Whenever law and order breaks down due to the political disputes, Manas becomes open to all poachers who create havoc in the Park, poaching rhinos and other animals and cutting down trees.

In October 1992, Bodos burned down anti-poaching camps and ambushed patrol parties; two staff members were killed in this incident, making a total of six field staff killed by Bodos since the strife started.

Rhino poaching increased again.

On 3 March 1993 there was an attack on the Bashbari Range Office by suspected extremists. The Range Officer was stabbed almost to death, and nine rhino horns weighing over six kilos were stolen from the strongroom. Administration weakened and staff morale fell; 13 rhinos were poached in the same month (Hazarika, pers. comm.).

In 1990 there were 54 guard posts and three range headquarters in Manas (Lahan, pers. comm.). Camps which were not destroyed in the early 1990s despite repeated attacks, and those camps which have been rebuilt, are all occupied by forest staff (Lahan, pers. comm.). Many guards are reluctant to work in the remote areas of the Park, however, because of the insurgency (Hazarika & Lahan, pers. comm.). There are four platoons of the state police to help at Manas and more are being sent. The Chief Conservator of Forests (Wildlife) Assam hopes paramilitary forces will be given by the Central Government. No rhino has been poached from May to early December 1993 because Bodo agitations have decreased.

The Bodos are the only insurgents around Manas; they are involved in rhino poaching and trading in the horns in order to buy guns. Some horns are sold in Bhutan. A Bhutanese princess named Dekichoden Wangehuk was arrested at Taipei airport in September 1993 with 22 Indian rhino horns weighing 14.9 kilos. At a meeting with Jonathan Loh of Traffic Taipei she admitted to having bought these horns over a period of one or two years. She had purchased them from a trader (not a poacher) who had probably obtained them from Assam, she explained. The princess paid up to \$6,666 a kilo, and was hoping to sell the horns in Taiwan to pay off a business loan. One of her companies is based in the town of Phuntsholing in southern Bhutan not far from Manas; thus Manas is probably where most of the horns originated. According to officials in both West Bengal and Assam, the trade in horn to Bhutan has been active since the mid-1980s. One official told us that Bodos from Manas have been regularly going to Phuntsholing with horns from Manas and Kaziranga to sell to several traders. Indians are able to go to Phuntsholing without a visa or even a passport, but if they go farther into the country they need special permission. In order to reduce the poaching pressure on the remaining rhinos in Manas this Bhutanese trade connection must be severed.



*Elephants destined for anti-poaching work and for tourist rides are trained at an early age as shown here in Orang Wildlife Sanctuary*

## **Maintenance and development of the Park**

The Central Government is becoming disillusioned about putting money into Manas to re-build bridges and buildings time and again, but it is essential that the government does allocate the necessary funds in order to keep a presence in Manas, or this important Park will be lost. At the moment there is money only to pay the 379 staff salaries and a few other expenses, according to P. Lahan, Director of Manas. The Park needs a lot of extra funds. "Let the camps be burned down and money 'wasted', but it is more important to keep the area" pleads the Chief Conservator of Forests (Wildlife) Assam (pers. comm.).

As for the long-term benefit of the Park, the people nearby must receive assistance. Only then will they support the Park authorities as opposed to helping the poachers. Crop damage is a problem: in a recent study of certain fringe villages south of the Park, 97% of the villagers are affected by elephant damage, 57% by deer, 52% by wild boar, 10% by monkeys, but only 5% by rhinos because the rhinos live in the central core of the Park and thus rarely come out to graze (Dey & Bhattacharjee, 1993). If insurance cover against crop damage could be provided by the state government, this would greatly reduce the adverse attitude of the people (which often results in people killing animals). Many of the villagers are hostile to Manas due to their feelings of deprivation and neglect.

Solutions to these problems have been studied by WWF India (Dey & Bhattacharjee, 1993); the first recommendation of this report states that influential residents should encourage and educate the villagers on the importance of protecting Manas. In addition, the government needs to spend a lot of money in upgrading the amenities for these villagers who presently are 74% illiterate and very poor.

## **ORANG WILDLIFE SANCTUARY**

### **Introduction**

Orang was first secured as a Game Reserve in 1915 because of its growing number of rhinos and in 1985 became a Wildlife Sanctuary. It lies on the north bank of the Brahmaputra, west of Kaziranga, and covers only 75.6 km<sup>2</sup> (see map). The first detailed census in 1985 recorded 65 rhinos. By 1991, 97 individuals were counted (see Table 9).

### **Poaching and anti-poaching activities**

According to the former Range Officer of Orang, B.N. Talukdar, from 1978 to 1992 93% of Orang's poached rhinos were killed inside rather than outside the Sanctuary. Hardly any rhinos wander outside, despite its small size, because there is no overgrazing in the Sanctuary. Rhinos are not poached by electrocution in Orang as there are no power lines. There are, however, incidents of pit poaching in the dry season. Pit trapping for rhinos began

Table 9: Number of rhinos in Orang Wildlife Sanctuary

Year	Number	Source
1966	12—25	Estimate by Spillet (1966)
1976	25—30	Estimate by A. Laurie (1978)
1985	65	Census
1991	97	Census
1992	100	Estimate by Assam Forest Dept.
1993	100	Estimate by Assam Forest Dept.

in late 1984, and in that year and 1985 12 rhinos were caught in this way (Martin et al., 1987). Three types of pits are dug: a 1.8 metre rectangular one into which the rhino falls and breaks its neck; a similar hole with an hour-glass-shaped cross-section in which the rhino is suspended above the base of the hole and may not be killed; and one with a v-shaped cross-section with pointed bamboo poles dug into the bottom which sink into the rhino's stomach. The poachers camp near the pits and check them every night and morning until a rhino is caught (Talukdar, pers. comm.). Most rhinos are killed by poachers using guns. The organizer usually provides a gang of four or five with firearms. In 1992 such a gang received from the organizer \$171 to \$514 per person for one horn.

From 1982 to 1985 poaching was serious in Orang, with 20 rhinos illegally killed. More staff and equipment, including a jeep, were consequently put into the Sanctuary, and the road system was improved. Thus, poaching declined. There are now 80 field staff in Orang with 37 guns (mainly .303 rifles), plus 35 casual labourers, 20 armed Home Guards and 14 domesticated elephants for patrol work and tourist rides. From 1988 to 1991, the Range Officer spent an average of \$340 a year on an intelligence network, but in 1992 it was stopped due to lack of funds; he believes that \$645 a year is now needed to be effective. Useful poaching deterrents in the meantime are the five wild rogue elephants in Orang. From 1987 to 1992, one of them killed 18 people (16 of them women), all outside the Sanctuary. As a result, Orang has very few human trespassers and thus cattle are not brought in to graze. Only four rhinos have been poached from 1990 to the end of 1993.

## Development and maintenance of the Sanctuary

Orang's main problem is that it cannot be expanded in size. On the north and east sides of the Sanctuary

are Bengali villages, while on the south and west sides Orang is being eroded by the Brahmaputra and Dhansiri rivers, respectively. Due to the Forest Department's severe cut-back in funds in 1993, repair work since the last floods has been minimal, and much maintenance is needed.

## PABITORA WILDLIFE SANCTUARY

### Introduction

Pabitora is further downstream from Kaziranga and covers a mere 16 km<sup>2</sup> (see map). With a population of at least 56 rhinos (counted in April 1993), it probably has the highest concentration of wild rhinos anywhere in the world (see Table 10). Pabitora was made into a Reserve Forest in 1971, and cattle and fishermen were then allowed in. In 1985 it became a Wildlife Sanctuary because of the growing rhino population, and people and their animals were officially excluded.

### The illegal killing of rhinos

The present Range Officer, B.N. Talukdar, estimates that at least 75% of the poached rhinos are killed when they wander outside the Sanctuary, which about a third of them do each night to look for food. This is the major problem; if rhinos could be kept inside the Sanctuary, poaching would decline. The main hunters are Nagas, Bodos and Bangladeshis resident in Assam who obtain their rifles from Nagaland and Bangladesh. Pit poaching does not occur in Pabitora as the grass is so overgrazed that the diggers and the mounds of earth would be easily spotted. Three power lines run directly through the Sanctuary. The first electrocutions occurred in 1989 (Vigne & Martin, 1991). There were no cases in 1993, however. The lines are patrolled at night, including those which are located outside the Sanctuary in the nearby villages.

Pabitora has 78 field staff with 14 .315 rifles and one 12-bore shot gun. Fifteen casual labourers help to patrol, along with four Home Guards. There are 25

Table 10: Number of rhinos in Pabitora Wildlife Sanctuary.

Year	Number	Comment
1987	54	Census
1993	56	Census: includes rhino habitat outside sanctuary

Source: Forest Department of Assam

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anti-poaching camps, 14 of which are now outside the Sanctuary. There used to be an intelligence system, but this has been brought to an end by the severe lack of funds. It must be re-established as poaching increased in 1992 and 1993 with seven rhinos killed.

## Maintenance and development of the Wildlife Sanctuary

Since our last visit to Pabitora in 1990, the habitat has deteriorated drastically; grass two metres high is now just stubble. The main reason is that the villagers illegally graze about 3,000 cattle within this small Sanctuary, and cattle grazing has been getting steadily more intense (Talukdar, pers. comm.). It is the main threat after poaching. The rhinos leave the Sanctuary because of disturbance and insufficient food.

Pabitora is surrounded by Bengali villages, and crop damage by rhinos mainly trampling the paddy is second in importance to the damage from wild boar. Crop damage here is probably the most serious in the state, yet there is no compensation. In addition, rhinos killed at least two people in 1987 and one in 1992. At least 15 to 20 rhinos go out each night in the dry season when crops are growing, and sometimes wander more than 30 km. The field staff can only help by driving the rhinos back into the Sanctuary with firecrackers and gunshots. Due to the present shortage of funds, the ordinary

Sanctuary maintenance was not carried out in late 1993 after the monsoon. For example, during our visit, the roads had not been cleared, making patrol work harder. Another difficulty is that people continually come illegally into Pabitora for thatch and fish. To worsen the problem, there is a lake leased to fishermen until the year 2000 in the southern part of the Sanctuary, which further encourages poaching. To save Pabitora, the trespassing and overgrazing must be stopped; this needs police assistance. Attempts have been made, resulting in mob attacks by the villagers. In August 1993 one policeman was beaten by the local people, and the Range Officer was forced to kill a farmer in self-defence (Talukdar, pers. comm.).

Even if all the cattle were removed so that the grass could re-grow, the Sanctuary would still be too small for the 56 rhinos. Extensions to the Sanctuary have been proposed, but with villages on all sides, competition for land is severe.

## CONCLUSION

The greater one-horned rhino in Assam has increased steadily in numbers since the start of this century, and considerable credit must be given to the people of Assam. An increase in political instability recently, however, poses a growing threat to the survival of the rhinos. There has been a steady rise in poaching

Photo credit: Esmond Bradley Martin and Lucy Vigne



*The first rhino to be electrocuted by poachers in Asia was in Pabitora Wildlife Sanctuary in September 1989.*

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over the last few years. Rhino horns from poached rhinos are sold to buy guns and more guns kill more rhinos.

Furthermore, there is now a severe financial problem. The Forest Department could be capable of making significant sums of money from tourism, if it raised its fees; presently, entry fees are only \$ 16 (5 rupees) and an elephant ride \$1.67. Yet there is little incentive for the Forest Department to make these increases, as all funds go to the state government. Furthermore, with Assam's instability, due to political agitations from ULFA and the Bodos, and the need for non-Indians to obtain restricted area permits to visit, foreign tourists are extremely few.

Yet at this precarious time, the Central Government of India has ended a Rhino Conservation Scheme (1986/7 to 1991/2) which provided a much needed sum of \$3,888,000 (67.5 million rupees) (Hazarika, pers. comm.). This scheme greatly helped rhino conservation and, since its termination, poaching has increased significantly. The year 1993 witnessed the worst poaching this century, except for 1983 when there was a breakdown in law and order in the State. The Assam Forest Department at the moment cannot support its own rhino protection measures, nor can it provide the small sums of money desperately needed for an intelligence network. The Department and the Government of India, for the first time ever, are seeking international assistance for the rapidly escalating poaching problem (Hazarika and S.C. Dey, Inspector General Wildlife, Ministry of Environment and Forests, Government of India, pers. comm.; and Bist et al., 1994). A secure flow of funds must be provided to maintain the parks and sanctuaries on a regular basis. The people of Assam certainly deserve assistance, and it will be an act of disastrous negligence, and a huge loss to the world, if their cries for help are not answered quickly.

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