

# *Wonders of Pabitora*



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**Bibhab Talukdar ■ Mrigen Barua**

*Aaranyak*

Aaranyak – a society involved in research and conservation of biodiversity in Northeast India has entered its sixteen year of service towards the cause of nature conservation in the region. From a small beginning in the year 1989, it has been slowly, but steadily growing to cater the complex need of biodiversity conservation in this diverse and culturally varied northeastern region of India. Thanks to well-wishers who have been part of our growing institution in entire northeast India.

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### **Bibhab Kr Talukdar:**

Bibhab Kumar Talukdar has passed his M.Sc. in Zoology with specialization in Ecology and Wildlife Biology from Gauhati University in 1993 and secured his Ph.D. degree from Gauhati University in the year 2000. He has been working in the field of conservation since 1989 just after obtaining his B.Sc. degree. He was born in September 1968. He has received international training on environmental education at the International Centre for Conservation Education in United Kingdom in 1991 followed by the North American Association for Environmental Education and Smithsonian Institute in USA during 1995. He has received international training on wildlife management at Nepal offered by the Smithsonian Institution in the year 1996. In the year 2000, he has received international training on Biodiversity Assessment and monitoring for adaptive management at the Conservation and Research Center in Front Royal, Virginia, USA, offered by the Smithsonian Institution.

Bibhab has been working in North East India, specially in Assam since 1989 on conservation of wildlife and policies related to wildlife and forests. He is the member of the State Board of Wildlife, Govt. of Assam, and also IUCN/SSC; Conservation Breeding Specialist Group, Threatened Waterfowl Research Group, Duck Specialist Group and Asian Rhino Specialist Group. He was the member of the seven men steering committee set up by the state government of Assam to prepare the new Forest Policy 2003 for Assam. He has been the Secretary



### **Mrigen Barua**

Mrigen Barua, Range Forest Officer, joined the Forest Department of Assam in the year 1987. After completing two years of in-service training, he has got opportunities to work in various parts of Assam on diverse field of forestry and wildlife. He is graduated from J.D.W.P.T. on Captive Breeding and Endangered Wildlife Management in the year 1995. He has also completed the Wildlife Conservation and Management Training Programme offered by the Smithsonian Institution in the year 1999. Shri Barua has served in Pabitora Wildlife Sanctuary for five and half years. Apart from the normal duties, he has carried out various research works on flora and fauna and received the prestigious award of “WWF Tiger Conservation Award” in 1999 and meritorious service award from the Forest Department of Assam in the year 2001. He is a member of IUCN/SSC; Conservation Breeding Specialist Group. He was instrumental in nabbing a number of dreaded poachers in Pabitora Wildlife Sanctuary and recovery of rhino horns and over 30 arms from various hideouts of poachers in association with Police. He has attended a number of seminars in various parts of the country and published scientific papers in various journals.

He is currently working as Range Officer of Geetanagar Wildlife Range in Guwahati. He has done intensive work in the field of wildlife conflict management including the human elephant conflict in Deepar Beel. Besides he has captured good number of problematic wildlife in and around Guwahati to save the citizens from danger.

*Wonders of*  
**PABITORA**

**Bibhab Kumar Talukdar**  
**Mrigen Barua**

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## F O R E W O R D

I am very pleased to learn that one of our young and promising forest officers - Shri Mrigen Barna has teamed up with Dr. Bibhab Kumar Talukdar, another young and keen Conservation Biologist to write a book on Pabitora Wildlife Sanctuary. The book is being published by Aaranyak- a prominent NGO working for biodiversity conservation in North East India.

I have no doubt .the book will delve in details and disseminate the much needed information about various aspects of flora and fauna of the Pabitora Wildlife Sanctuary, one of the smallest Protected Areas in Assam harbouring maximum density of Indian Rhino. The efforts taken by Mr. Barua and Dr. Talukdar are indeed praiseworthy. I am sure that the book will encourage the young conservationists of Assam to undertake various research, studies and conservation projects in other bio-diversity hotspots in association with the Forest Department of Assam.

Minister of State (Independent)  
Environment & Forest, Assam.

## P R E F A C E

The North Eastern region of India is very rich in biodiversity and has been termed as one of the hotspot for conservation of the vast array of flora and fauna. However, the vast array of unique flora and fauna although fascinating and with full of mysteries, are little studied if not un-studied and its importance are little appreciated.

To keep track on the fauna and flora of a particular area, documentation is very important. We feel that this comprehensive report can be taken as proper scientific information of Pabitora Wildlife Sanctuary. Hence it can be utilized as a reference book for further study.

The first written documentation "A Checklist of Birds of Pabitora Wildlife Sanctuary" was published in the year 1993 by Mr. Bhupen Talukdar and Pankaj Sarma as a token of their round about study of the sanctuary. Their attempt is really praiseworthy. After a gap of three years, we have taken up the work with objective of bringing out detailed and comprehensive information about the fauna and flora and also some other important information of the sanctuary, as the result of earlier studies remained scattered.

As a matter of fact we have spent almost four years carrying out this study for documentation of flora and fauna and other related information. The initiative that we have taken is very less in comparison with tasks having many fold directions. Therefore, it is obvious that few species of plants and animals or some other information might either be dropped or not found during the study period. Hence wildlife activists, naturalists, zoologists are requested and hopefully invited to carryout further study over the sanctuary in future to update the information for better conservation and protection of wildlife and habitats, specially the rhino.

Mrigen Barua

Bibhab Kumar Talukdar

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**CONTENTS**



## INTRODUCTION

Pabitora Wildlife Sanctuary is located in the flood plains of the river Brahmaputra further downstream of Kaziranga National Park and Laokhowa Wildlife Sanctuary within the Mayong circle of Marigaon district, Assam.

Mayong is a fertile plain with numerous wetlands and tributaries surrounded by three prominent hillocks. Because of its ever-fertile lands, this area is known as northern fertile plains. Landless people far off places use to grow paddy in this swampy riverine grassland and gradually turn these areas their abode. In this way, whole of the area was transformed into vast expanse of cultivated field and swamps were drained out. After 1960, heavy flow of immigrant people into this area had diminished the forest further.

At the fringes of the present sanctuary, only few fragmented forest patches virtually remained untouched by the settlers. This particular patch of riverine grassland named Pabitora was initially marked as the grazing Reserve. Seeing continuous flow of new immigrants and for fear of complete destruction of the forests, the original inhabitants become conscious and demanded to declare the grazing area as Protected Area. Such a public demand backed by conservation of the last and small fragmented population of Indian One-horned Rhino, cited there was the initial force to declare a compact un-inhabited 1584.62 hectare area as the Reserve Forest in the year 1971. Only few families (Khuti Owner) who were temporally settled inside the said area were shifted to adjacent Thengbhangha area.

This research team has while carrying out the study on the past history in Mayong area revealed the existence of wild elephant since 1538. During 1655-68, an earthen *bund* (embankment made of earth) known as Hatigarh was constructed near Amaramul to protect the area from wild elephants. It was, therefore, concluded that till 16<sup>th</sup> century, wild elephants roamed around in these areas. In 1665-72 period, wild elephants were captured by the king of Mayong and offered the captured elephants to the then Ahom Kings to establish and maintain good will and friendship.



According to historical evidence, one King Rahan Singha is said to have killed a wild elephant at Tamuliduba, which is now inside Pabitora Wildlife Sanctuary. Existing temples in and around Pabitora Wildlife Sanctuary depicting Hindu God Ganesha corroborates the existence of elephants. One of the prime factors for non-existence of wild elephant at present in Pabitora area may be attributed to the development of railway tracks through Panbari hillock area and conversion of grassland areas in between present Pabitora and Panbari hillock to paddy cultivation. This might have become a barrier that stopped the elephants to maneuver in present Pabitora and Mayong area.

History also reveals the existence of hog deer and sambar in Pabitora. The fact is supported by the present existence of sambar antlers in the residence of late Rasadhar Deka, the village heads (Gaon Burha) of Kamarpur village. Similarly antlers of hog deer were found in various houses in Mayong area.

There is also historical evidence of the presence of Bengal florican, (now endangered) in Pabitora area. Dr. Gautom Narayan and Lima Rosalind of Bombay Natural History Society recorded the Bengal Florican in Pabitora on 3rd May 1989, which was the last sighting.

Although it is believed that the rhino came into Pabitora area only during 1970s, however, the historical documents reveal the presence of Rhino in Pabitora and Mayong area since 1925. As per published information (Deka, 1996), during the tenure of King Rohan Singha, one rhino calf was kept in his palace as pet. But, after few months, the calf died due to Diarrhea.

Again, as per the past official information, three rhinos were found dead, one each at Raja Mayong, Sildubi and Barhampur. The villagers handed over the rhino horns to Nagaon Police. That proves that the entire riverine belt of River Brahmaputra, from Sadiya to Dhubri, was originally a rhino habitat. But due to large scale conglomeration of human during 1950s resulted in the fragmentation of this rhino habitat. And finally, the rhino started concentrated in few pockets like Laokhowa, Kaziranga, Orang, Pabitora and Manas.

# Wonders of PABITORA

## N A M E O F P A B I T O R A

As per a published souvenir of Assam Sahitya Sabha in the year 1994, late. L.K. Hazarika, who happened to be the then Chief Conservator of Forests (Assam) and member of Assam Public Service Commission, revealed that the name Pabitora infact came from a name of King's daughter of Mayong, whose name was also Pabitora/Pabitra. Due to untimely death of King's daughter - Pabitora/Pabitra, the King declared the name of the area as Pabitora to commemorate her name.

As per Late Hazarika, around 14 rhinos were present in Pabitora during 1961-62. When Mr. Hazarika was the DFO, Nagaon division, a report was received by him that one rhino died in Pabitora during winter of 1961-62. He visited the area immediately and recovered the rhino horn. He also did a reconnaissance survey and found 14 rhinos in that area. That was the first initiative for declaring the area as Protected area and finally in the year 1971, a total area of 1584.76 hectare was declared as Reserved Forest on November 18, 1971 vide notification FOR/Sett/592/65/54, dated 18/11/1971.



## **PRESENT STATUS OF THE SANCTUARY**

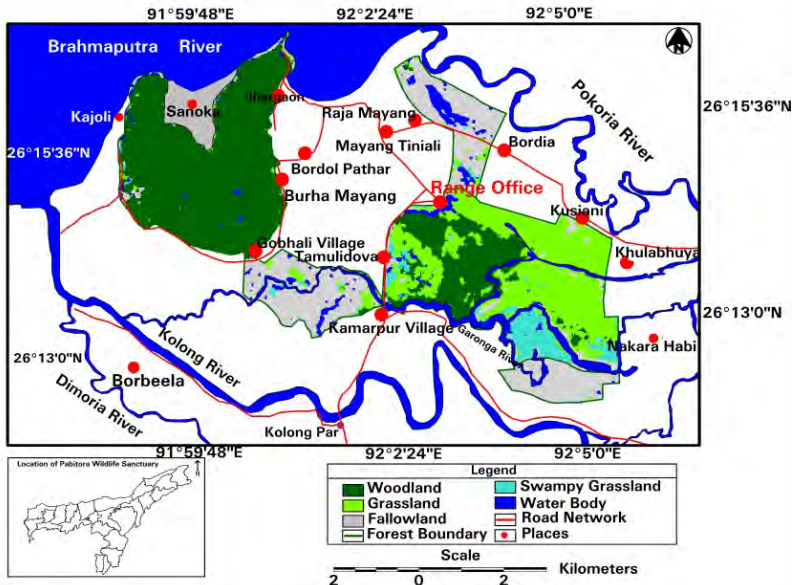
The introduction of forest management in Pabitora enhanced the habitat attributes to the Reserve forest and rhino population registered a substantial increase. Since 1981, scientific grassland management was adopted in Pabitora RF after successful result shown in Kaziranga National Park and Orang Wildlife Sanctuary (now a National Park). These results indicated considerable increase of rhino population in Pabitora sanctuary and the area was inserted in the world's wildlife map marked as a place with highest density of the Indian one-horned rhinoceros population. In view of its international importance and steady increase of rhino population, the area was notified as Pabitora Wildlife Sanctuary on July 16, 1987 vide preliminary Government Notification FWR/19/87/39. Finally a total of 3880.62 hectare area was declared as Pabitora Wildlife Sanctuary on March 17, 1998 vide Government Notification FRS/19/87/152, dated 17/3/1998.



## AT A GLANCE

### TOPOGRAPHY:

The sanctuary being a flat terrain, situated in the flood plains of Brahmaputra, Kalong, Pokoria and elevated at an average 15-25 m above MSL excluding Raja Mayong Hill which is newly included in the sanctuary. The MSL of Raja Mayong hillock is 80-350m. Though the total area of the sanctuary is 38.81 sq. km, the state government is yet to hand over 1107.24 hectare area. Hence 2782.34 hectares area is under present management. The only natural boundary of the sanctuary Goronga beel on the south-west side and Brahmaputra on the northern side. The area fall within 26 12'N to 26 15'N and 92 2' E to 92 5'E. The sanctuary area is flat with a gentle east to west inclination excluding Raja-Mayong hillock.



## C L I M A T E   A N D   S O I L

The climate of the Pabitora Wildlife Sanctuary can be treated as sub-tropical monsoon type with three distinct seasons. The dry mild winter, experiences very occasional showers, i.e., November to mid-February. This period had an average maximum temperature of 20°C and average minimum temperature of 9°C. The humidity at this time is around 40%. This is followed by a humid and windy summer, i.e., from mid-February to May with maximum and minimum temperature of 35°C and 12°C. This is followed by rainy season, i.e. from May to September with an average rainfall of 2,000mm. This season is both hot and humid. The Maximum temperature is 35°C and humidity raised up to 95%.

The entire sanctuary area is part of the Brahmaputra flood plains. Being low lying, it is subject to annual floods and cause flood like situation in the sanctuary. As such, water remains round the year in different lakes, swamps, making Pabitora an ideal ground for rhino and also migratory waterfowl. The soil is turned as fertile, clayey loam, with silt. The Goronga, Haduk and Sitalmari are the perennial source of water in the sanctuary. Few shallow lakes, nallahs were also scattered all over the sanctuary. The important wetlands inside the sanctuary are - Tamilidova, Pagladova, Jugdol beel, Lombadova, Tuplung jan.



**MAMMALS:** The habitat of Pabitora WLS provides shelter to about 23 species of mammals (table-13). The Rajamayong hillock of the sanctuary houses more species of mammals as the area is dominated by tree forests, while the grassland provides shelter to key species – the great Indian one horned rhino.

**Table-13: Mammals of Pabitora WLS**

No.	Common name	Local name	Scientific name	Remarks
1	Great Indian Rhino	Gohr	Rhinoceros unicornis	Highest Concentration
2.	Leopard	Nahor Phutuki Bagh	Panthera pardus	Rare
3.	Jungle Cat	Bon Mekuri	Felis chaus	Common
4.	Fishing Cat	Mashuoi Mekuri	Felis viverrina	Rare
5.	Leopard Cat	Latamakori Bagh	Felis bengalensis	Common
6.	Wild Boar	Bonoria gahori	Sus scrofa	Common
7.	Large Indian Civet Cat	Johamal	Viverra zivetha	Common
8.	Small Indian Civet Cat	Johamal	Viverricula indica	Common
9.	Jackel	Ram Xial	Canis aureus	Common
10.	Rufous tailed Hare	Xohapahu	Lepus nigricollis ruficaudatus	Common
11.	Chinese Pangolin	Bon Rou	Manis pentadactyla	Rare
12.	Smooth Indian Otter	Udd	Lutra perspicillata	Rare
13.	Asiatic Water Buffalo	Bonoria Moh	Bubalus bubalis	Common

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14. Flying Fox	Baduli	<i>Pteropus giganteus</i>	Common
15. Short Nose Fruit Bat	Baduli	<i>Cynopterus sphinx</i>	Common
16. Indian Pipistrelle		<i>Pipistrellus coromandra</i>	Common
17. Rhesus Macaque	Malua Bandar	<i>Maccaca mulata</i>	Common
18. Barking Deer		<i>Muntiacus muntjak</i>	Rare
19. Hoary Bellied Squirrel	Kerketua	<i>Funambulus callosciurus pygerythrus</i>	Common
20. Small Indian Mangoose	Neoul	<i>Herpestes auropunctatus</i>	Common
21. Crab Eating Mangoose	Neoul	<i>Herpestes urva</i>	Rare
22. Toddy Cat	Johamal	<i>Paradoxurus hermaphroditus</i>	Rare
23. Binturong	Arctictis binturong	Single record at Rajamayong hillock	Rare





## RHINOCEROS UNICORNIS



## POPULATION DYNAMICS

When Pabitora was declared as RF in the year 1971, only eight rhinos were cited (the “Survey of the Fringe villages of Pabitora WLS and its Eco-development Management Plan”, Department of Forest, Govt. of Assam, March 1994). After introduction of forest management in Pabitora, the rhino population starts increasing gradually. In the year 1987, first official rhino census was conducted that counted 54 rhino in the WLS. In a span of 16 years(1971-1987), the rhino population has increased by 7 times, however, the area of the sanctuary remains almost same. Considering the above facts, scientific grassland management was introduced in Pabitora from 1987 after getting good results yielded at Kaziranga National Park and Orang WLS (presently a national park). After that rhino census was conducted in the year 1993, 1995, 1999 and 2006 which has been summarized in Table-14.

**Table-14: Census figure of Rhino in Pabitora Wildlife Sanctuary**

Year	Adult			Sub Adult			Calf	Total
	Male	Female	Un-sex	Male	Female	Un-sex		
1987	17	19	—	5	8	—	5	54
1993	18	21	1	1	2	2	11	56
1995	11	28	3	3	1	13	9	68
1999	17	26	—	7	5	—	19	74
2006	18	30	—	—	—	12	21	81

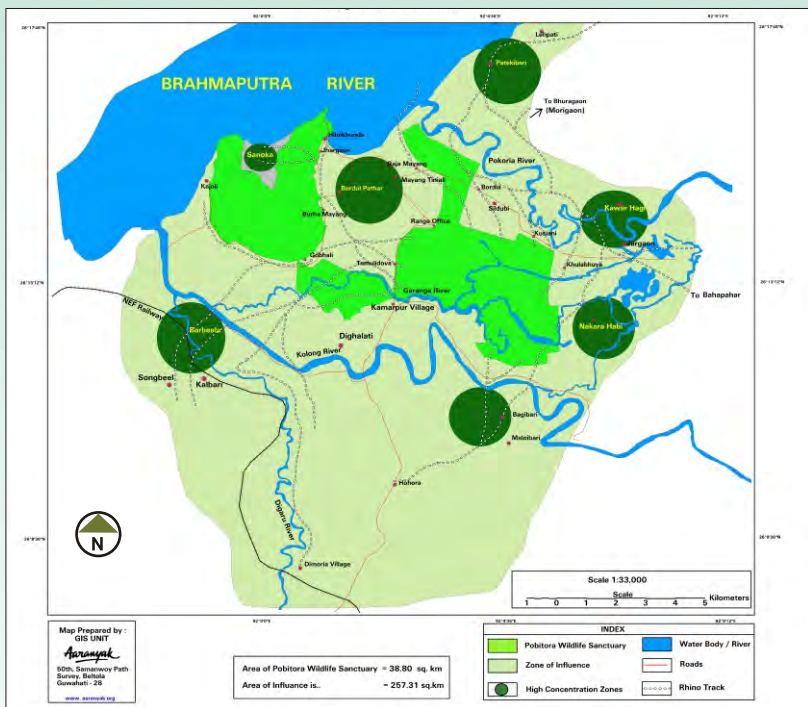
A steady increase of rhino population was observed at Pabitora WLS. Considering the above facts, the sanctuary was proposed for extension upto 38.81 sq km, which was later notified in the year 1998. But the district authority is yet to hand over the newly notified lands, excluding Raja-Mayong RF to the forest department.

The 1999 census of rhino in Pabitora revealed that there are 43 adult rhinos representing 58.11% of the total rhino population, followed by 12 sub-adult representing 16.22%, 19 calf representing 25.68% of total rhino population in Pabitora WLS. There are 24 male rhino representing 30.43% of total rhino population, while female population stands at 31, representing 41.89% of the total rhino population, besides calf. The male-female ratio stands at 1:1.29 at Pabitora WLS in the year 1999. The latest rhino census carried out in Pabitora on 8<sup>th</sup> March 2006 recorded a total of 81 rhinos of which 18 adult male and 30 adult female besides 21 calf and 12 un-sexed rhinos. The male-female ratio in 2006 stands at 1:1.66.

During our field study it was observed that in average 20-30 rhinos stray out from the sanctuary every night for their nocturnal activities. Their main activities in the night are grazing, migration, and even mating. Though many wildlife activists and zoologists mentioned in various newspapers and magazines about over population of rhino in Pabitora WLS, conclusion can't be provided as no scientific study on the carrying capacity of the rhino was ever conducted there.

# Wonder of PABITORA

During our field study, it was observed that the rhinos from Pabitora WLS, developed the tendency of migration from the month of November. We have followed few rhinos on elephant back upto Moirabari area (Marigaon), Kurua (Kamrup), Bhuragaon (Marigaon), Chawlkhowa Chapori (near Mangaldoi), Nangoli Char, Nepali Char, Kajia Char, Ganeshbari Char, Kayamari Char, Puthimari Char, etc. While following the rhinos, the tract they followed was properly identified. The route of rhino straying out of the sanctuary were mapped during 2004-05 which is shown in the following figure-1



*Fig-1: Rhino Straying routes identified in and around Pabitora WLS*

## PROBLEMS OF PABITORA WLS:

The present problem at Pabitora WLS observed during our field study are -

- Excessive livestock grazing
- Flood
- Siltation
- Encroachment
- Poaching
- Weeds

**Excessive Livestock Grazing:** The livestock grazing is one of the major problem of the WLS. The Pabitora WLS was surrounded by 21 villages. As there is very little natural boundary, i.e., Goronga on the western side and Brahmaputra on the northern side, the fringe villagers had developed a tendency of releasing their live stocks in the WLS. Regarding the problem, we had discussions with various local people and their views are - Pabitora WLS was initially a grazing reserve and hence from many decades they used to release the live stocks in the present sanctuary area. And as there are no other grazing reserve in and around, they are some how compelled to release their live stocks. Due to this, around 50% of the total grassland was found degraded and in Naltoli areas, the grass height is found to reduced to 25-30 cm and a PAN has already been formed in the soil for which growth of grasses were stunted comparatively than similar areas of the WLS as well as outside. The intensity of grazing was observed highest in the winter season. In an average 600-800 live stocks come inside the WLS everyday. Due to extensive livestock pressure, the Bengal Florican *Eupodotis bengalensis*, once being abundant, was last recorded in the year 1993.

**Flood:** As the sanctuary is situated in the low lying areas, the flood water from the Kalong, Pakaria and Brahmaputra River respectively flooded the entire sanctuary excluding Raja-Mayong hillock. The sanctuary faced two major floods in the year 1988 and 1998 on which

almost 80% of the total sanctuary was submerged, excluding few artificial high lands. In 1998, two rhinos were died due to flood. Other than rhino the animals died are - Wild Boar, Jungle cat, Civet cats, Pangolin, Jackals. Even every year, flood causes extensive damage to the infra-structure of the sanctuary. In the same year, four anti-poaching camps were swept away during the flood.

**Siltation:** Due to development of roads from Komarpur to Mayong and Mayong to Bhakatgaon, percentage of siltation in the swamps and lakes of the WLS were increased considerably. As the flood water enters the sanctuary mainly from Brahmaputra and Pakoria first, the obstruction provided by the above mentioned roads causes the major siltation when the flood recedes. Presently, Jugdol, Pagladuba and Tamuliduba are heavily silted. Due to this, rhino were observed stray out from the sanctuary even in the day time for their regular water activities (wallowing).

**Encroachment:** Around 300 bighas of land were encroached upon by fringe villagers (new settlers) on the western corner of the WLS. The entire matter is sub-judiced at Gauhati High Court since 1993. The newly included area, i.e., Komarpur area (490.24 ha), Diprang area (171.00 ha) and Murkata I and II (446.00 ha), which was yet to hand over by the district authority is using by local people for bodo crop cultivation.

**Weeds:** The major weeds causing problem in WLS are - *Ipomea vericata* (Bhotera), *Michania micratha* and Water Hyacinth. As flood water remains inside the sanctuary for a pretty long period in the year 1998, causes extensive damage on few grassland species, specially *Phragmites kakra* and from the same year it was observed the growth of *Ipomea* increases extensively covering more than 5% of the total sanctuary area. Apart from that, *Michania sp.*, affecting mainly in the artificial highlands and patrolling paths. It was also observed that water hyacinth start propagating from the onset of monsoon and during the month of June, it extensively covers almost all the lakes, swamps and nallahs causing severe problem in patrolling duties inside the park. Even sometimes it was observed that small mammals struck up inside the hyacinth and died.

**Invasion of Trees:** The ecological process of reclamation of grassland by tree cover is detrimental to the habitat requirement of the rhino population. When the canopy density of trees exceeds 75%, then the under growth become completely bare. In the year 1989-90, 1 sq km area in a mid of the sanctuary was fenced up for Sanghai (brow-antlered deer project). But due to various reasons, the department was unable to procure Sanghai from Manipur. As such, the annual control burning and other management system, which was stopped in the fenced up area, provides maximum scope to propagate *Albezzia* sp. And finally more than 13.09% of the total sanctuary land was covered by wood lands. The seeds of *Albezzia procera* dispersed during the flood and starts propagating in other areas also, which decreases the grassland inside the WLS.

**Poaching:** Poaching is a major threat to the rhinos in the sanctuary. Other than rhino, there is no any record of poaching of other animals. In Pabitora WLS, it was observed that the poachers normally using two methods - (i) poached by using fire arms and (ii) Electrocutation. There are only single instances of poisoning in the year 1987. There is no record of pit poaching in Pabitora WLS for last 14 years.

Other than poaching, there are various reasons of natural deaths of rhinos in the WLS (table-15).

**Unplanned Electricity Connection:** It has been observed that two high-tension line (11,000 KV) and two domestic line passes through the sanctuary. Apart from that, for bodo (a kind of crop) cultivation, numerous electrical connections were provided in the paddy fields by ASEB, Assam. The poachers often took advantage of these electric line for electrocuting rhinos inside the WLS and stray rhino outside the WLS.

**Table-15: Natural Deaths of Rhino**

Year	Flood	Natural Illness	Salinity	Infigtings	Remarks
1987	—	—	—	—	
1988	1 FC	1 MC, 1 F	1 F	1 MC	High Flood
1989	—	1 FC	—	—	
1990	—	1 F	1 M	—	
1991	—	—	—	1 FC	
1992	—	—	2 M	—	
1993	—	—	—	1 F	
1994	—	—	—	1 F, 1 M/SA	
1995	1 F	—	—	—	
1996	1 F	—	—	1 MC	
1997	—	—	—	2 MC	
1998	1 MC, 1 FC	—	—	—	—
1999	—	—	—	3 MC	
2000	—	—	—	1 MC	
2001	—	—	—	—	
2002	—	1 M/SA	—	—	
2003	—	1 F	—	1 MC	
2004	1 F,	1 F 1 MC	—	—	
2005		4			
2006		2			

**Key:** FC= Female Calf; MC= Male Calf; F = Female; M = Male;  
SA= Sub Adult

## CRITICAL REVIEW OF WILDLIFE CRIME SCENARIO IN PABITORA WLS:

Using of fire arms and electrocution are the two major methods used by rhino poachers at Pabitora WLS. There was a single instances where two rhinos - mother and calf was killed by chemical poisoning in the year 1987. In last 13 years, — rhinos were killed by using fire arms and — by electrocution (Table- 17). The first electrocution of rhino occurred

on 29<sup>th</sup> August 1989. Normally, the poachers take advantage of the stray activity of the rhino and electrocute them. As because two high tension line and one domestic line passed through the sanctuary, poachers sometime used those lines for the same purpose. So far 11 rhinos were electrocuted outside the sanctuary and 5 inside the sanctuary. After development of fringe areas, the local people start using electric pumps for irrigation in their fields. For that purpose, Assam State Electricity Board, fixed numerous electric connections in the adjacent paddy fields and Khas lands. This is one of the major problem for anti-poaching staff of the sanctuary to monitor each and every line in every night. In 1986, the anti-poaching staff of the WLS detected one pit at Hahsara area, where one domestic livestock found trapped and died. From the above facts, it can be ascertained the reason of avoiding pit poaching method in Pabitora WLS. Earlier it was mentioned that almost every day 600-800 live stocks grazed inside the sanctuary. Using of fire arms for killing rhino by poachers is highest so far with 27 poached rhino since 1987 till March 2001. The arms normally used by rhino poachers are - 500 bore rifle, 470 bore rifle, 303 rifle, nuzzle loader (Khaja), carbine etc [Source: Detection of arms and ammunition in last 14 years, Office of the Range Forest Officer, Pabitora WLS].

From the record it was revealed that the rhino poachers living adjacent to the sanctuary hired professional shooter from different parts of the state and even outside the state, more specifically from Dimapur of Nagaland for the purpose. Till March 2001, 13 rhinos were killed by using fire arms outside the sanctuary and 14 inside the sanctuary.

While conducting our study, a significant information came out from the record that the rhino have a tendency to migrate towards Laokhowa, Kochmara, Burachapori and Orang.

The tracts are Duboritoli-Gagoldubi-Kholabhuya-Patekibori-Sildubi-Bonmuri-Sidaguri-Hatimuria tract. As well as during the same period, rhinos have the tendency to migrate through Vekeni Pathar - Kanjuli Pathar-Kurua tract towards Kurua Reserve Forest. The appearance of rhino at Laokhowa WLS in the year 1998 confirms the migration activities of rhino either from Pabitora WLS or Orang NP. And interestingly 10 male rhinos were poached on the above mentioned



tracts. Considering all above facts, 4 anti-poaching camps were constructed on this tract to prevent/monitor the stray as well as the migration activity of the rhino.

Even in winters, temporary camps and tents were fixed outside the sanctuary to control the stray activity of the rhino. All these camps and also the camps inside the sanctuary were provided with arms, ammunition and wireless communications. The departmental elephants do night patrolling in the fringe areas of the sanctuary to monitor the rhino as well as assisting field staffs.

**Table-16: Details of Rhino Poaching in and out of Pabitora WLS**

Year	Rhino Poached inside WLS	Rhino Poached Outside WLS	Horn recovered	Poacher Arrested	Poacher Killed	Arms recovered	Ammunition recovered
1987	2P	Nil	Nil	1	Nil	1	Nil
1988	1B	2B	Nil	Nil	Nil	Nil	Nil
1989	1E	1E, 2B	Nil	Nil	Nil	1	Nil
1990	1B	1B	Nil	Nil	Nil	Nil	Nil
1991	Nil	1B	Nil	Nil	Nil	Nil	Nil
1992	Nil	2E, 1B	Nil	Nil	Nil	1	2
1993	1B	3B	Nil	Nil	Nil	Nil	Nil
1994	1E	3E	2	5	Nil	Nil	Nil
1995	2B	Nil	Nil	Nil	Nil	Nil	Nil
1996	2E, 1B	2E	Nil	Nil	Nil	Nil	Nil
1997	2B	1B	Nil	Nil	Nil	Nil	Nil

# Wonder of PABITORA

Year	Rhino Poached inside WLS	Rhino Poached Outside WLS	Horn recovered	Poacher Arrested	Poacher Killed	Arms recovered	Ammunition recovered
1998	1E, 1B	2B	1	2	Nil	1	2
1999	3B	3E	1	28	Nil	20	102
2000	2B	Nil	Nil	17	Nil	6	Nil
2001	Nil	Nil	Nil	3	Nil	1	Nil
2002	1E	Nil	1	2	Nil	Nil	Nil
2003	2E	Nil	1	Nil	Nil	Nil	Nil
2004	Nil	1B	Nil	Nil	Nil	Nil	Nil
2005	Nil	1B	Nil	Nil	Nil	Nil	Nil
2006	2B	1B	Nil	2	Nil	1	5
<b>TOTAL</b>	<b>2P,8E,16B</b>	<b>11E,16B</b>	<b>6</b>	<b>60</b>	<b>Nil</b>	<b>32</b>	<b>111</b>

Key : E = Electrocuting; B = Bullet P = Poisoning

During 1987 till 2006 altogether 53 rhinos were killed by poachers of which 29 were killed inside and 24 outside.

Interestingly out of the five electrocuted rhino inside the sanctuary mentioned in the Table, three rhinos was killed in between Kasuoni AP Camp to Kholabhuyan AP Camp where one domestic electric line passes through the sanctuary. Altogether 11 male rhinos were killed by poachers in the Bonmuri-Duboritoli tract, which is outside the sanctuary, which is towards Orang NP. All the 11 rhino is above 25 years of age. It may be possible that the male rhino number was less in Pabitora in the recent years and there is a tendency of male rhino to migrate towards Orang may be to get better opportunity to find a mate? Further study in this matter in near future will reveal more light into this hypothesis.

**Table-17: Month-wise Poaching in Pabitora**

Year	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1987	—	—	—	—	—	—	2P/F	—	—	—	—	—
1988	—	—	1B/M	—	—	—	—	—	1B/F	—	1B/M	—
1989	1B/M	—	—	—	—	—	—	1E/F	—	—	1B/M	1E/F
1990	1B/F	—	—	—	—	—	—	—	—	—	1B/M	—
1991	—	—	—	—	—	1B/M	—	—	—	—	—	—

Year	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1992	—	—	2E/M	—	—	—	—	—	1B/M	—	—	—
1993	1B/M	—	—	—	1B/F	—	—	—	1B/F	—	—	1B/F
1994	—	1E/M	1E/F	—	—	—	—	1E/M	1E/M	—	—	—
1995	—	—	—	—	1B/F	—	—	—	1B/M	—	—	—
1996	1E/M	—	—	—	—	—	—	1E/F, 1E/M	—	1E/F	—	1B/F
1997	—	—	—	—	—	1B/F	—	—	—	—	2B/F	—
1998	—	1B/M	—	—	—	—	—	—	—	—	2B/M	1E/F
1999	1E/F,	1E/M, 1B/F	—	—	1B/M	—	—	1B/M	1E/F	—	—	—
2000	—	—	—	—	—	1B/F, 1B/M	—	—	—	—	—	—
2001	—	—	—	—	—	—	—	—	—	—	—	—
2002	1E/M	—	—	—	—	—	—	—	—	—	—	—
2003	—	—	—	—	1E/FC, 1E/F	—	—	—	—	—	—	—
2004	—	—	—	—	—	—	—	—	—	—	1B/M	—
March 2005	—	1B/FC	—	—	—	1B/F	—	—	—	—	—	—

Key: M= Male; F = Female; C= Calf; B=Bullet; E=Electrocution; P=Poisoning

The other tract in which few rhino were killed is Kanjuli Pathar - Kajoli - Kurua tract. In these two tracts, the stray rhino moves very long distance from the sanctuary. There are records of rhino moving through path-1 upto Orang and Mangoldoi, while through Path-2, the rhino migrated upto Hajo and Kokrajhar.

### Why Rhino Loses the Tract ?

1. Loss of scent mark if they cross through human habitation, ploughing paddy field (bodo Cultivation), if they cross Highways or roads where vehicular traffic flow is very high and also when it becomes nervous mainly due to high intensity human disturbances.

It has been observed that the rhinos that were killed during infighting mostly belonged to calf and sub-adult male. The male adult rhino often attack the male calf or sub-adult male during pre-mating time. When the female rhino comes to the Ester cycle, the dominant male rhino pretend the male calf or sub-adult as a competitor and hence aggressiveness of the adult male towards male calf and sub-adult was found very high. This results in the high mortality of calf and sub-adult male. Rhino also died to ruminal tympani in Pabitora due to illness (as per Post Mortem Report).

A sizeable number of rhinos were killed outside the sanctuary while straying out from Pabitora WLS. The distance between the poaching site of various rhinos from Pabitora WLS boundary are summarized in

**Table-19:**

Year	Month	Site	Distance	Mode of Poaching	Natural
1987					
1988	Feb	Duboritoli	6 Km	1F	
	Sep	Kamarapur Beel	1 Km	1BF	
	Sep	Gobardhan		1M/C	
	Nov	Kamarapur Beel	1 Km	1BM	
1989	Jan	Gagoldubi	6 Km	1B/M	
	Aug	Kholabhuya	500 mt	1E/FC	
	Nov	Duboritoli	6 Km	1B/M	
	Nov	Kamarapur Beel	1 Km	1F/C	
1990	Nov	Duboritoli	6 Km	1B/M	
1991	Jun	Duboritoli	6 Km	1B/M	
1992	Mar	Patekibori	8 Km	1E/M	
	Mar	Nekera	1 Km	1E/M	
	Sep	Sildubi	2 Km	1B/M	
1993	Jan	Bonmuri	8 Km	1B/M	
	Dec	Kanjuli Pathar	2 Km	1B/F	
1994	Feb	Sildubi	2 Km	1E/M	
	Mar	Rajamayong	500 m	1E/F	
	Sep	Kanjuli Pathar	2 Km	1E/M	
1995	July	Vekeni Pathar		1F	
1996	Jan	Kuraniburi	2 Km	1E/M	
	Oct	Diprang	3 Km	1E/F	
1997	Nov	Kanjuli Pathar	2 Km	1B/F	
1998	Feb	Sidaguri	8 Km	1B/M	
	Nov	Boha Doloni	4 Km	1B/M	

Year	Month	Site	Distance	Mode of Poaching	Natural
1999	Jan	Hatimuria	5 km	1E/F	
	Jan	Hatimuria	5 Km	1E/MC	
	March	Nekera Habi	1 Km	1B/M	
	July	Kukuari Village	1.5 Km	1E/F	
2004	Nov	Buramayong	0.40 Km	1B/F	
2005	Jan	Murakata	1.4Km	1B/F	

Key: M= Male; F = Female; C= Calf; B=Bullet

It was also observed that from the month of September every year, the rhinos of Pabitora WLS starts migrating or straying out from the WLS. As all the rhino habitat of Assam was presently fragmented and due to large scale human settlement in the riverine grassland of river Brahmaputra, there was very little scope for rhino to migrate from one habitat to other. Even though, in the year 1999, five rhino appeared in Laokhowa WLS which confirms their migration activities as currently Laokhowa does not have any residential population of rhino. Apart from that from 1996-2000, rhinos of Pabitora WLS stray or migrate to various places. There was confirmed records of rhino moves out from WLS towards Kurua, Hajo, SONapur of Kamrup district, Gashbari, Tepuri, Chawldhuwa Chapori, Rangoli Char, nepali Char, Mangoldoi of Darrang district and Patekibori, Gagolmari, Borbori, Santala, Monoha upto Bhuragaon of Marigaon district.

Hence a detailed field study becomes very much urgent to develop corridors between different rhino habitat for better management in near future.