REPORT

Population Estimation of Greater One-horned Rhinoceros (*Rhinoceros unicornis*) in Manas National Park, BTAD Assam

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Submitted By

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Manas National Park in the *Terai* belt of Assam has a viable population of more than hundred rhinos prior to 1989. But, the former resident rhino population of Manas National Park was wiped out due to poaching in the early 1990s during insurgency in western Assam. After the formation of Bodoland Territorial Council (BTC) in 2003, Assam Forest Department and BTC in collaboration with other conservation organizations (IFAW-WTI, WWF, IRF, USFWS) started rhino reintroduction program under Indian Rhino Vision (IRV 2020) in 2006 through translocation of rehabilitated rhinos from Centre for Wildlife Rehabilitation and Conservation (CWRC) Kaziranga and wild to wild (W-W) translocation from both Kaziranga NP and Pobitara WLS of Assam.

A population estimation exercise was conducted from 22th March 2021 to estimate the total rhino population present in Manas National Park. The entire rhino population estimation exercise was conducted as per the following schedules:

Table 1: Tentative Schedule of Population Estimation in Manas National Park-2021

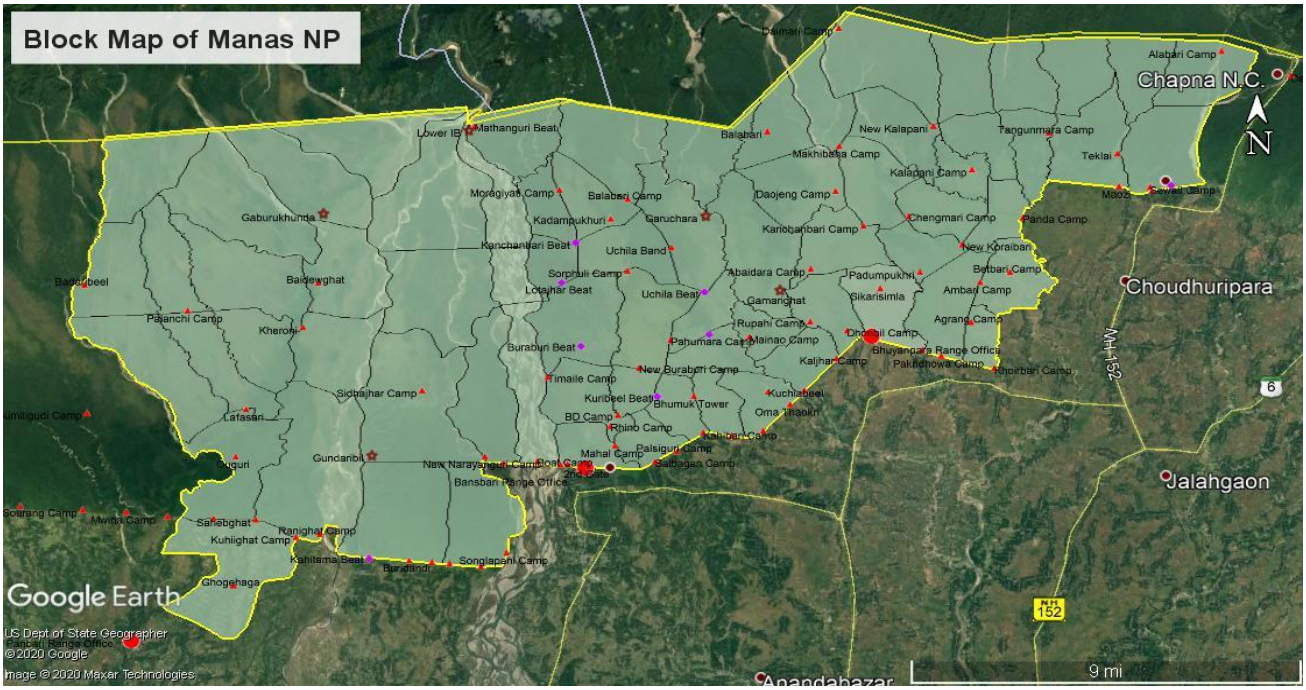
Date	Time	Venue of Meeting/ Area of Census	Participants	Exercise Details
20-03-2021	10:00 to 12:30 Hrs	Bhuyanpara	Bhuyanpara	Pre-estimation Training
20-03-2021	02:30 to 05:00 Hrs	Bansbari	Bansbari, Panbari, Kahitema	Pre-Population Estimation
22-03-2021	05:30 to 11:00 Hrs	Bansbari, Panbari, bhuyanpara, kahitema	All the Ranges & Beats of Manas National Park	Population Estimation

Methodology

Population estimation is an important management tool for scientific management of wild animals. The primary objectives of conducting such population estimation of wild animals are as follows:

i. Estimation of total numbers of the species
ii. Sexing and determination of Male-Female sex ratio
iii. Analysis of population trend and age-class
iv. Monitoring of habitat and habitat utilization
v. Determination of carrying capacity of the protected area.

To assess the population of Rhinoceros, the "**Total Count**" or Direct count method was followed in each block of the Manas NP. This method involves dividing the total area into smaller units or blocks separated by natural barrier such as rivers or streams and forest paths (Fig 1). Each anti-poaching camp and its adjoining area was considered as a sample block. Some anti-poaching camps which are in close proximity were merged to form a single block for the population estimation exercise. This method generally assumes that the animals present in a block do not move to other block during population estimation and hence can be considered as "**Closed Population**" of the block. Also, simultaneous counting of the animals in all blocks will avoid double counting even if the animal shifts from one block to other.



The rhino population estimation exercise was carried out in all the three ranges (Bhuyanpara, Bansbari and Panbari) of Manas NP. A total sixty-four estimation blocks were assessed in all the ranges such as Bhuyanpara (21 blocks) from eastern boundary of Manas NP to Goruchara river in the west, Bansbari (23 blocks) from Goruchara river in the east to Beki river in the west and Panbari including Kahitama beat area from Beki river in the east to the western boundary of Manas NP. Pre-estimation trainings were conducted on 20th of March, 2021 before the estimation in each range where the enumerators were individually explained the area of estimation, methodology and the use of GPS in detail. For the first time **MsTripes Mobile Patrol application** used extensively in the Population Estimation of Rhino. One **GPS/MsTripes** Mobile and data sheets were provided to each enumerator. Departmental Elephants were deployed to the allotted estimation blocks one day in advance. The estimation started at 5.30 am simultaneously in all over the enumeration area covering the potential habitats of rhinos within each of the block and ended by 11am.

In each estimation block, rhinos were counted from elephant backs and on foot by one pre-trained enumerator in each estimation group. Only direct sightings of the rhinos were considered for counting the numbers. Whenever the rhinos are sighted, total number of individuals, sighting time and geo-locations were noted down. Sex and age of each rhino were visually assigned and recorded into four age-sex classes such as adult males, adult females, sub-adult, and calf for understanding of the population structure.

Fig 2: Pre-Estimation Training of the Enumerators.2021

Results Summary

A total 40 number of rhino individuals estimated in all the three ranges of Manas National Park (Table 2) which have confirmed sighting records during the estimation period. Considering the sightings records, it has estimated the minimum total number of Rhinoceros of 40 individuals to the total population (total 44 rhinos are present as per official record of Manas Tiger Project) present in Manas National Park of Assam.

Table 2: Block wise sighting records of Rhinoceros in different ranges of Manas National Park

Sl. No.	Block Name	Time of Sighting (hh:mm)	Geo-Location		Adult		Sub-Adult			Calf
			Latitude	Longtitude	Male	Female	Male	Female	Unknown	Yes/No
Bhuyanpara Range										
1	Sengmari	06:06	26.74603	91.12926		1			1	
2	Abwidora	06:09	26.72478	91.08128		1			1	
3	Abwidora	06:46	26.73623	91.08266		1				1
4	Abwidora	07:22	26.74755	91.03128	1					
5	Range Office	05:33	26.72612	91.08127		1				1
6	Makhibaha	06:37	26.77396	91.10141				1		
7	Teklai	06:31	26.77589	91.207778	1					

Bansbari Range										
1	New- Buraburi	05:46	26.69809	91.02583		1				1
2	Kuribeel	06:31	26.67255	91.04095	1					
3	Kuribeel	06:45	26.67499	91.03511	1					
4	Kuribeel	07:37	26.68406	91.02108		1				1
5	Bangalee Hatdhuwa	05:45	26.70604	91.03591	1					
6	Kahibari	05:35	26.67332	91.04358	1					
7	Kahibari	05:43	26.67204	91.04122	1					
8	Landangpara	06:22	26.40341	91.32216					1	
9	Bura-buri	06:15	26.70556	91.00305				1		
10	Sorphuli	06:01	26.73117	91.022222	1					
11	Sorphuli	06:04	26.73083	91.02138		2			1	1
12	Kadampukhuri	10:35	26.749702	91.009230		1				1
13	Barengabari	09:00	26.67125	91.0279		1				
14	Rafting Party	09:55	26.69396	90.97283	1					
15	Rhino Camp	06:55	26.68512	91.00298					1	
16	Mahal	09:38	26.66129	91.02279		2			2	1
Panbari Range										
1	Baideoghat		26.72501	90.90111	1		1	1		

The sex ratio of Male and Female Rhinoceros population of Manas NP was estimated at 1: 1.2. This ratio has been obtained without considering 18 individuals (11 sub-adults and 7 calf). The male and female ratio of 1: 1.2 has established that the rhino population of Manas National Park is having a healthy sex ratio. The number of calves born in the wild reflecting the positive growth of Rhino population in Manas National Park. The density appears to be very low (0.08 individual per sq. km) if we consider the entire landscape of Manas National Park.

Table 3: Age and Sex classification of Rhinoceros in Manas National Park

Age Class	Adult		Sub-Adult	Calf	Total Rhinoceros
	Male	Female			
Total	10	12	11	7	40

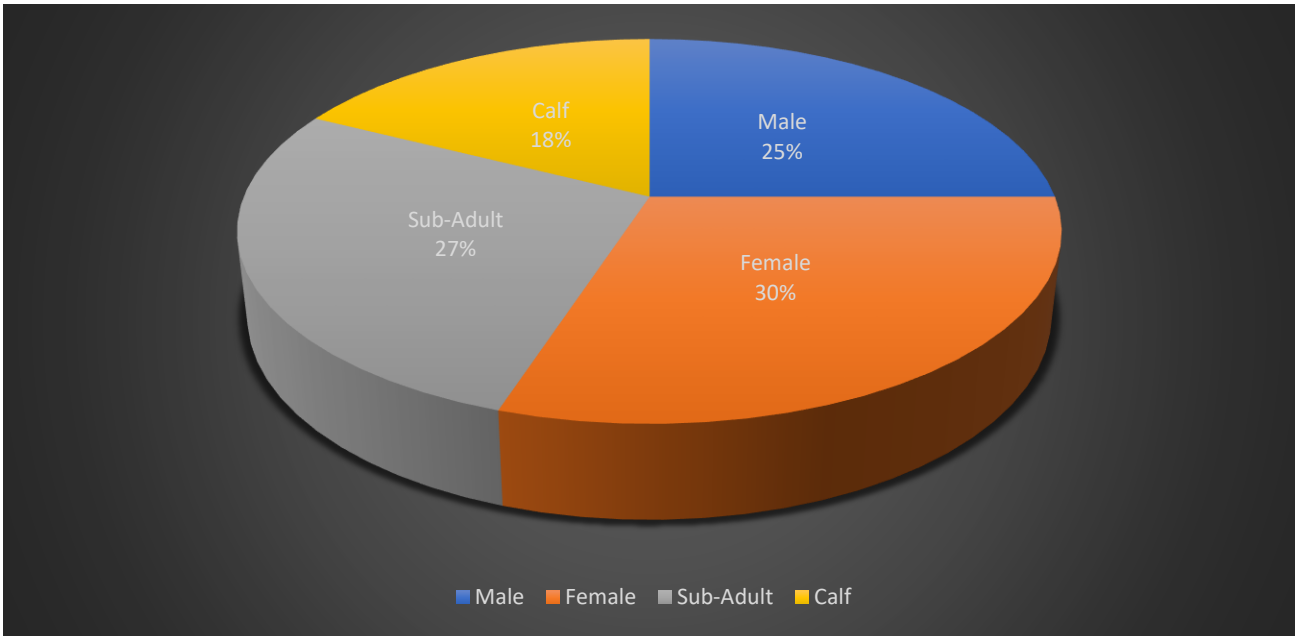


Figure 3: Age and Sex wise percentage of Rhinoceros in Manas National Park

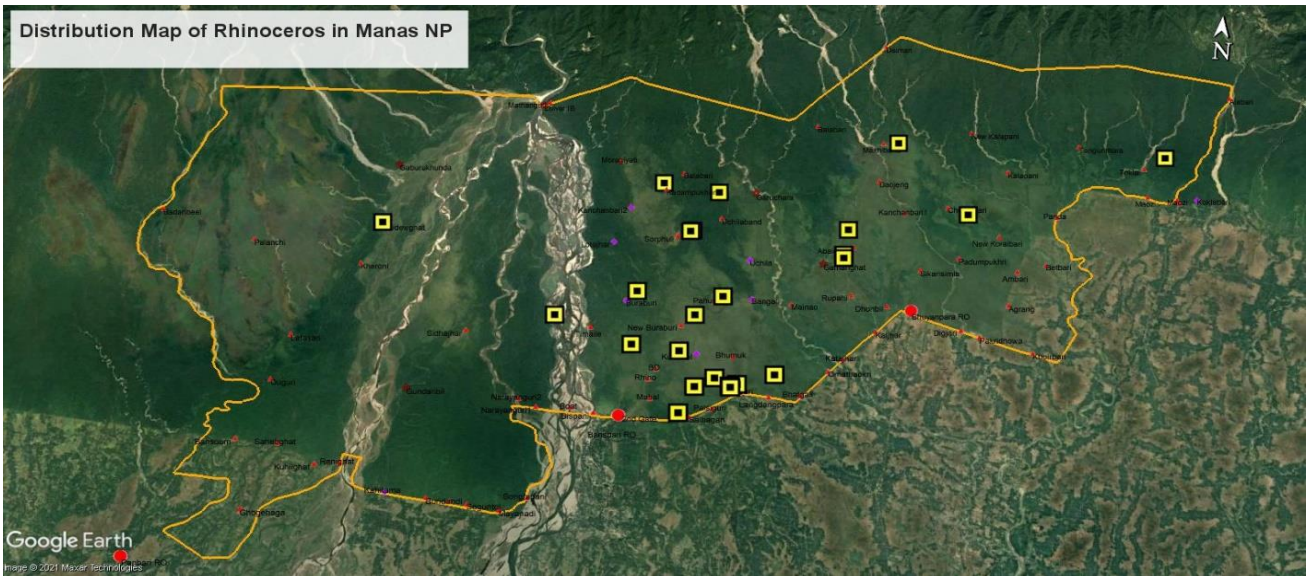


Figure 4: Distribution of Rhinoceros in Manas National Park

Constraints

Though the population estimation was conducted intensively to enumerate all the individuals of Rhinoceros present in Manas National Park, but there are some limiting factors which mentioned below:

i. The enumerators in most of the estimation blocks couldn't cover the entire area due to inaccessibility. Periodic search operation (at least two search operation in every month) must necessary to maximize the detection of rhinos in different habitats of Manas National Park.

ii. Maintenance of regular sighting records of rhinoceros in the respective areas of each anti-poaching camp will be useful to assess the number total rhinos and their movement in different seasons of the year in Manas NP.

iii. Enumerators must be trained more rigorously on identifying age-sex differences of the target species and on the proper methodology of population estimation to avoid biasness in age-sex classification.