

# The population status of the greater one-horned rhino in India and Nepal, and the importance of regular monitoring

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## Introduction

The greater one-horned rhino (GOH), (*Rhinoceros unicornis*) is one of the largest in number of the five existing rhino species. Until recently the GOH rhino was prominently found to occupy areas along the Indus-Ganges-Brahmaputra valley. The GOH is an iconic species in India, and currently even though the population numbers seem to be healthy, the distribution is mainly confined to small pockets in Nepal and India with the majority of the population confined to a single protected area (PA). Hunting and habitat destruction pushed the species to the brink of extinction, and by the early 20<sup>th</sup> century only around 200 were found (Rookmaaker et al. 2016). However, effective protection and conservation measures along with active population management including range expansion programmes have helped the species recover to its present status.

The species is found in limited areas selecting specific habitat and is still under significant threat of poaching. As such it is vital to put in place a regular monitoring system to understand population trends, demographics, habitat availability and usage, genetic and health dynamics and other related parameters within and between populations. With climate change it will now be more important than ever to put in place appropriate monitoring mechanisms as scientists are predicting weather conditions which will have a detrimental impact on the eastern Himalayan region which is likely to affect the water catchment of the area, and the grassland and wetland habitats preferred by the rhinos.

The importance of monitoring the GoH rhino was realized in the 1950s and 1960s and initiatives were taken by the various forest authorities

which hold rhinos to provide as accurately as possible the population estimates. The time intervals between censuses had not been standardized however, and were anywhere between two and five years.

Jaldapara National Park (NP) in West Bengal reports having begun counting its rhinos from 1957 when it found 57 individuals with an adult sex ratio of 1.33 females for every male. Kaziranga NP in Assam has records of rhino censuses being conducted systematically since 1966 when 366 individuals were counted. The counts have been taking place more regularly in Kaziranga starting in 2006 when the results yielded an adult sex ratio of 1:1.2 (male to female). We have records of systematic rhino counts in Orang NP from 1985, Pobitora WLS from 1987 (Assam Forest Department 2014) and Gorumara from 1998 (CCF Wildlife North 2019). Nepal is the second country that has a GOH population and records indicate that rhino censuses there started in detail from 1994 which detected 466 rhinos in the country (Department of National Parks and Wildlife Conservation, Nepal, 2006). Realizing the importance of putting in place robust and uniform rhino monitoring systems, the Ministry of Environment and Forests, Government of India, established the standard operating protocol (SoP) for its GoH rhino population monitoring in 2020. It advocates taking a uniform approach for conducting rhino censuses and repeating the count of the same population every fourth year in all the rhino bearing areas of India. The SoP suggests the continuation of the traditional total count method as well as testing out new methodologies to make the approach scientifically more robust so that the efficacy of methods can be compared to make appropriate changes in the monitoring methods in future (MoEFCC, WII and WWF 2020).

After the adoption of the SoP, the first uniform census was carried out in 2022 by all three rhino

bearing states of India and which determined the presence of 3,282 rhinos. Nepal conducted its latest count in 2021, which yielded a population of 752 (NTNC 2021), indicating there are 4,034 rhinos in the wild spread over eleven PAs within India and Nepal.

The total or direct count method was continued for the population census of 2022 in India. For undertaking this exercise, the entire PA is divided into enumeration blocks, and the sizes and shapes of the blocks are determined by on-the-ground conditions. Every enumeration block is traversed in a forward moving pattern and each rhino individual encountered is recorded in a pre-designed data format. A team is allotted to every enumeration block to conduct the count and the exercise is done in a zig-zag pattern to maximize the coverage of the area; this optimizes not missing any individual and care is also taken to avoid double counting of individuals. The team is usually comprised of three members with one lead enumerator, and they traverse the block ideally on trained elephants and in some instances on foot to look for the rhinos. The exercise is usually completed in a single day if the geographic size of the PA is small like that of Pobitora WLS (38.5 km<sup>2</sup>) and is continued over two days dividing the PA into distinct parts like in Kaziranga NP and its additions (~889 km<sup>2</sup>). This time, a double count approach was also tested in Orang NP and Pobitora WLS in Assam and Dudhwa NP in Uttar Pradesh, and the outcome has been found to be

satisfactory. In Dudhwa, where the rhino population is confined to two areas, the count was done by dividing each area into uniformly sized grids of 5 km<sup>2</sup>. In all cases the enumerators started the surveys in the early morning, between 5.00 am and 7.00 am and the teams on average took around three hours to cover a single block; and in some instances, where the terrain was more difficult, it took them more than eight hours.

In addition to the above PAs, there are also rhinos in Manas NP in Assam where they were reintroduced under the Indian Rhino Vision 2020 programme after intense poaching decimated them in the 1990s.

Here the direct count method revealed 40 rhinos in a 1:1 sex ratio, however, the day of counting was affected by heavy rains and waterlogging making the census operations difficult to cover the entire area thoroughly. As this is a newly introduced population, a regular monitoring and recording exercise is carried out by the NP authorities which indicates that there are approximately 50 rhinos. In addition to the direct count method, the line transect method was also tested in the NP which indicates the population estimate to be 49 rhinos (Manas Tiger Reserve 2022).

Scientists and researchers are wary about the direct count method due to various limitations, but this has been successfully used to monitor the GOH rhino. The biggest benefit is that the numbers are comparable over a timeline to understand the performance of the population as well as check the robustness of PA management, and interventions. The method is resource intensive, laborious, needs numerous skilled teams and adequate numbers of trained elephants,

Table 1. The 2022 census revealed the current status of the Greater one-horned rhinoceros in India

Protected area	Size of PA (km <sup>2</sup> )	Population	Adult sex ratio (M:F)	Population trend (compared to previous direct count census)
Orang NP, Assam	78.81	125	1:1.18	5.9% annual growth
Pobitora WLS, Assam	38.85	107	1:1.65	1.5% annual growth
Kaziranga NP (and additions), Assam	889.51	2613	1:1.20	2% annual growth
Jaldapara NP, West Bengal	216.5	292	1:1.33	7.7% annual growth
Gorumara NP, West Bengal	80	55	1:1.54	1.9% annual growth
Dudhwa NP, Uttar Pradesh	680.32	40	1:2.28	3.5% annual growth

Source: <https://forest.assam.gov.in/information-services/detail/data-of-wildlife>  
<https://www.dudhwanationalpark.in/>

yet it is facilitating keeping track of the rhino population in the PAs of India and Nepal and has been contributing towards the successful conservation of the species in both countries. The increasing population trend is no doubt an indicator of success, but it also raises the need for better and more holistic monitoring of the species as well as its pro-active management as the highest proportion of the population in Asia (~65%) is still concentrated within Kaziranga NP in Assam. There is also a need to expand the scope of monitoring to include demographic and health parameters and also include habitat performance and viability analysis to develop conservation plans.

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