WellBeing News

Volume 1
Issue 6 *WellBeing News - Vol. 1, Issue 6, July 2019*

Article 3

7-10-2019

Rhino Mortality Spike in Chitwan: A Natural Process or Cause for Concern

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Established in 1973, Chitwan (950 Sq. Km) is Nepal's first National Park. This World Heritage Site is currently home to 600 Greater One-Horned Asian Rhinoceros ***(Rhinoceros unicornis)***. This is a six-fold increase in rhino numbers since 1968 when a helicopter-cum-ground count estimated that there were no more than 110 rhinos in the Chitwan Valley.

Chitwan houses the world's second largest population of the species. The largest population (2,400 individuals) is in India's Kaziranga National Park (430 Sq. Km.) in the state of Assam in North-East India. The major threat to rhino populations in India is poaching. By contrast, the World Wildlife Fund reports that Nepal has achieved an unprecedented five-year-long (365 consecutive days) periods when no rhinos in Nepal were poached from 2011 through April 2018. In short, poaching is not a serious threat for rhinos in Nepal these days, largely due to an effective anti-poaching program that includes active community participation in conservation. However, there has been a

significant recent increase in rhino deaths in Chitwan that has caused some alarm.

According to a report by Abhaya Raj Joshi—an environmental journalist there has been a significant increase (81 deaths between 2004 and 2014) in the discovery of dead rhinos in Chitwan over the last 15 years from apparently natural, but unknown causes. (Source: Mongabay Series: Asian Rhinos – Note: Mongabay is a non-profit that has built an impressive track record over the last 20 years providing conservation and environmental news.) Another Nepalese source, Ujjwal Satyal, reports that, on the average, one rhino dies every eight days in Chitwan National Park. Then, in the June 24, 2019 issue of the Himalayan Times—a Kathmandu English daily—he further reports that 40 rhinos have died from unknown causes over an eleven month stretch of the past year (from mid-July 2018 to mid-June 2019). If these reports are true, then the rate of rhino deaths in Chitwan is increasing.

Authorities at Nepal's Department of National Parks and Wildlife Conservation (DNPWC) are baffled by the above statistics and have formed a commission to investigate the causes of the deaths. But that is the easy part. Collecting the data to determine what is happening is much more difficult.

The DNPWC along with its main partners in conservation such as the National Trust for Nature Conservation (NTNC), the Nepal branch of the World Wildlife Fund (WWF), and the London Zoological Society (ZSL) have many well-educated and competent field staff in conservation and management on whom to call. Nevertheless, like most developing countries, Nepal lacks a fraternity of well-qualified and experienced veterinarians and facilities in wildlife medicine. Moreover, unlike in captive conditions in zoos, authorities in wilderness areas such as Chitwan National Park face considerable logistical challenges when attempting to conduct postmortems of wild rhinos and diagnose the causes of deaths.

First, it takes time to reach the dead animal before scavengers ravage the carcass which decays fast in sub-tropical Chitwan. Second, there is a lack of human and technical resources to preserve and postmortem the dead rhino.

Chitwan National Park is a major tourism hub in Nepal, and the rhino is the iconic attraction. The national is park also a very important source of jobs and income for the local people who live in its vicinity as well as an important source of foreign exchange for the government. Therefore, alarming statistics on the deaths of rhinos in Chitwan is a very sensitive issue which has attracted a great deal of public attention. There have also been many speculations on the causes of the deaths but there is a paucity of concrete scientific evidence supporting any of the speculations. There are three predominant, but so far unsupported, hypotheses.

First Hypothesis: The density of rhinos in Chitwan has grown beyond the Park's carrying capacity.

Chitwan National Park measures 950 Sq. Km. with 70% of the land area covered by Sal (Shorea robusta)—a hard forest, 20% by grassland, 7% by riverine forest, and 3% by mixed forests. The last three types, totaling 30% the park or about 320 Sq. Km., are the prime habitat of the rhinoceros. This hypothesis argues that the size of the park, particularly the pristine rhino habitat is too small to sustain 600 rhinoceros. Consequently, the spike in the deaths of rhinos is a consequence of overcrowding, increased aggression and fighting for mates and waterholes, and ultimately leading to an increased death rate, presumably from wounds or infection. However, critics dismiss this hypothesis by comparing Chitwan with Kaziranga National Park in India. They point out that the Chitwan houses less than 1 rhino per Sq. Km. while Kazaringa has close to 6 rhinos per Sq. Km. They also claim that comparing Chitwan with Kaziranga is akin to comparing apples with oranges, because most of Kaziranga (51% of grasslands, 29 % of mixed tropical forests, and swamps, waterbodies, and sandy banks for the rest) is optimal habitat for rhinos.

Second Hypothesis: The "Baby Boomers" are dying off.

The second theory compares the spike in new rhinos born since Chitwan National Park was established in 1973 with the American "Baby Boomers." Because of strict protection from poaching and habitat destruction, the "boomer rhinos" born after 1973 have lived longer than any rhinos before the creation of the Chitwan National Park. Assuming that the life span of rhinos in Chitwan is 35 – 45 years (based on zoo records), then there has been a spike in the "boomer rhinos" cohort as the population of Chitwan rhinos grew from 110 to 600. Those "boomer" rhinos will be reaching the end of their normal life span in the past two decades and will be dying of old age. Thus, it is argued, there is no need to panic, as, like most animals, the rhino population will also stabilize over time. Nevertheless, critics claim that the absence of reliable mortality data particularly on date, place, and age of rhinos, is a problem.

Third Hypothesis: Zoonotic diseases are being transferred from domestic livestock.

Wildlife biologists were baffled when thousands of Saiga antelope (Saiga tatarica) mysteriously dropped dead in Kazakhstan in 2015. Initially, epidemiologists connected the deaths to infections with Pasteurella multocida, a common bacterium that causes a range of diseases in domestic and wild animals. Later, scientists attributed the mass mortality of the Saiga from the infection to unprecedented high humidities and warm temperatures—a result of climate change in the rolling steppes of Central Asia; and not to a direct transfer of diseases from infected domestic livestock or humans. Nevertheless,

Professor Richard Kock of the Royal Veterinary College London reiterates the high risks to endangered animal, particularly small populations from zoonotic diseases transferred from livestock.

The death of five captive Sumatran rhinos (***Dicerorhinus sumatrensis***) in Malaysia within three weeks in 2003, perhaps illustrates Professor Kock's concern. Postmortems of the dead Sumatran rhinos indicated common infectious agents from domestic animals may have been the cause of death. The rhino enclosure shared a fence with a herd of domestic water buffalo. (Source: For Javan rhinos, the last holdout may also be a deadly disease hotspot. https://news.mongabay.com/2018/11).

Chitwan National Park is surrounded by a large number of villages, and sightings of rhinos grazing with domestic cows and buffaloes are common, particularly along the national park's edges and in the buffer zone forests between the villages and the park. The wildlife managers of Chitwan have long feared the transmission of diseases from domestic animals to wildlife. Therefore, many wildlife managers now believe that some unknown infectious diseases are being transferred from livestock and is causing the increase in rhino deaths. Yet, partly because of the logistical challenges in conducting proper medical diagnoses and postmortems, the spike in rhino deaths in Chitwan has not been linked to any domestic animal disease (although there have been some reports that tapeworms have infected the rhinos).

The raw data on rhino deaths leads to a key but difficult question: How many deaths per year can a healthy population of rhinos sustain in Chitwan National Park. So far, the highest number of rhinos that have died naturally in a single twelve-month period is 44 – or about 7% of the current rhino population in the park. Is a seven percent annual mortality normal or abnormal. Would it have an insignificant overall impact on the survival of Greater One-Horned Asian Rhinoceros in Chitwan or does it presage a calamitous decline in the future? We currently do not have an answer for either question.

Both Nepalese and foreign scientists have undertaken applied research on ecology and behavior of large mammals, particularly rhinos, tiger and deer, since the creation of Chitwan National Park in 1973 leading to a number of publications, including books and articles in peer-reviewed journals, on the Chitwan rhinos. Yet, long-term research on the health and disease of wild free-ranging Asian rhinos is virtually non-existent. This particular case reveals yet again how ill-prepared we are to answer fundamental questions about wildlife health and disease and about the challenges of conserving the remaining populations of charismatic megafauna.