

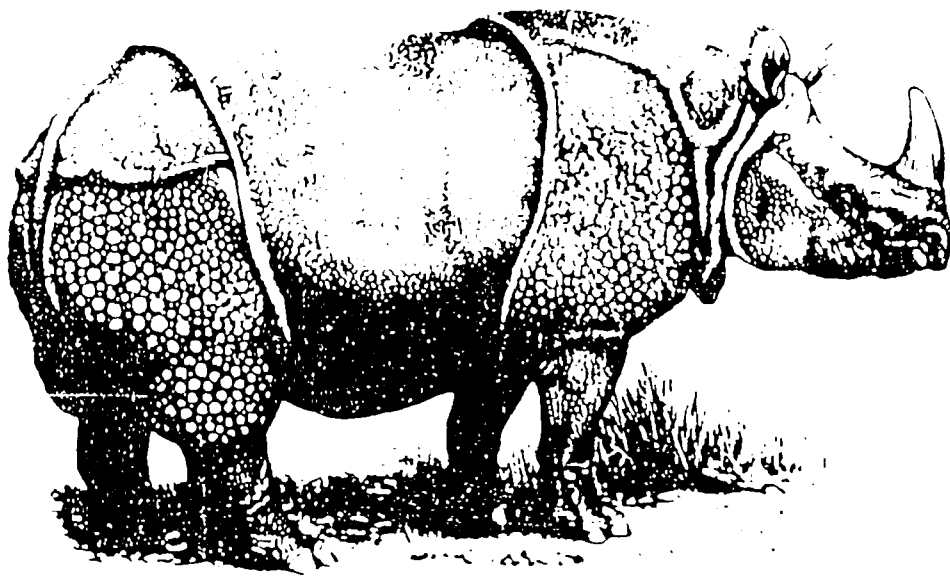
**IUCN/SSC  
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(AsRSG)  
MEETING**

***BRIEFING BOOK***

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**SECTION 6  
NEPAL RHINO ACTION PLAN**

**STRATEGIES OF RHINO  
CONSERVATION IN NEPAL  
1993**



**Department of National Parks and  
Wildlife Conservation, HMG  
Nepal**

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1992 9 p  
1993 8 p

## INTRODUCTION

The rapid rise and spread in human population has meant the gradual elimination of the many large mammals from their historical range in the past, the principal reason being loss of habitat. Wildlife habitat deteriorated so rapidly in the last few decades that Nepal witnessed a colossal loss in its wildlife especially large mammals such as rhinos, elephants, tigers, Gangetic dolphin and snow leopards. The conversion of forests for agriculture, hydroelectric projects, and encroachment from human-related developments have constricted and fragmented wildlife habitat, and threatened the life-support systems of many species.

This paper is a synthesis of existing information on Nepal's one-horned rhino (*Rhinoceros unicornis*) to identify conservation issues connected with their distribution, population dynamics, critical habitats, and threats to conserve rhinos through action plan.

The rhinos are of special conservation interest because of their role in the maintenance of Terai biodiversity as their phylogeny, ecology, and nutritional energetics have evolved around the grassland ecosystem. The one-horned rhinoceros is the second largest of the five extant species which was once widespread on the Indian sub-continent. As a result of habitat destruction and hunting for the much valued horn, there are

Beale

1986  
1991

28 head  
4 killed by poachers

48

fewer than 2000 individuals, restricted almost entirely to eight small protected areas in Assam and west Bengal of India, southern Nepal, and Bhutan. Nepal has by far the second-largest remaining population of the one-horned rhino.

The massive reduction about the rhino has been primarily due to the disappearance of most of the alluvial plain grasslands as they were also the most suitable for rice cultivation. By 1970s, rhinos were confined to the Royal Chitwan National Park only and later they were reintroduced in the Royal Bardia National Park. Catastrophe such as an epidemic disease, severe flooding or a breakdown in protection measures could drastically deplete the total rhino population as only two protected areas contain rhinos. Furthermore, these small patches of alluvial plains in these protected areas face a danger that could change the course of vegetational succession to a climax condition unsuitable for successional species like the rhino. Therefore, the long-term future of the rhino in Nepal lies within protected areas but these protected areas are increasingly interrupted by human activities and development programs.

#### STATUS OF RHINO POPULATION IN CHITWAN

The Chitwan rhino population declined from an estimated 1000 animals in 1950 to 60-80 animals by 1962 when land clearing followed by malaria eradication and heavy poaching. Strict

protection reversed this decline. Investigations revealed that the population had increased to 270-310 individuals by 1975 with 73 (32.3%) adult females, 45 (19.9%) adult males, 48 (21.2%) sub-adults and 60 (26.6%) calves. After 20 years of protection, the Royal Chitwan National Park now supports a viable population of 350 - 400 rhinos at a growth rate of 2.8%. The increase in rhino number since the late 1960's demonstrates that populations can rebound vigorously when provided with sufficient habitat and protection.

Chitwan rhinos provide an example of a population that almost went extinct while still carrying high genetic diversity.

Eric Dinerstein and Gary McCracken suggest that the high heterozygosity is a consequence of the large population size prior to 1950 and long generation time on average. The genetic bottleneck occurred only recently. The present rhinos have retained 90% of the heterozygosity of the original population going back to 1400 A.D. Given the accelerating rate of extinction, threatened species like *R. unicornis*, which were, until recently, common and widespread, may yet retain a substantial proportion of their original heterozygosity.

Studies in the past have suggested that the Chitwan rhino population will continue to grow to a size exceeding 500 rhinos. Several large tracts of grasslands, suitable to maintain high densities of rhinos, are currently under utilized which could have been the result of

harassment by cattle herders occupying these areas.

The north-east population in Chitwan is indicative of a large herbivore population still in the expansion phase as the population has increased by 86 animals (48.9%) between 1975 -1988 with an average annual rate of increase of 3.76%/year. In contrast, the West population has increased by only 22% since 1975 for a mean annual rate of increase of 1.7%/year. In the eastern part of the park, poaching may have artificially reduced rhino densities. However, some of these grasslands are bordered by sal forest, a habitat offering little forage for rhinos and other large ungulates. It is doubtful if these areas will support increased numbers of dispersing subadults and non-breeding adults.

#### HABITAT STATUS

Increased numbers of rhinos are apparent within blocks of the suitable rhino habitats in Chitwan. Rhinos occurred in highest densities along the flood plain grasslands and riverain forests bordering the Rapti, Narayani, Reu, Dhungre and Icharni Rivers, suggesting riverain grasslands as the single most critical habitat dominated by 4-6 m tall *Saccharum spontaneum*. These grasslands are interspersed with patches of riverain forests which together account only 30% of the Park's 1,038 km<sup>2</sup>. In contrast, the vast sal forests (*Shorea robusta*), an evergreen association on well-drained slopes,

covering 70% of the Park, are rarely used. Rhino densities were positively correlated with the percent of the block covered by *Saccharum spontaneum* grassland, along stream banks. *Saccharum* is fundamental as it exceeds 50% of the rhino diet each month. *Saccharum spontaneum* is unique among the common tall perennial grasses because plants sprout new shoots soon after cutting, grazing, or inundation by floods whereas others do not sprout again after these manipulations. Such dominance depends on annual habitat disturbance by monsoon floods. Monsoon floods deposit silt on the *S. spontaneum* grasslands bordering major rivers and, after receding, create favorable germination sites for seeds of this tall grass. Floods have probably always been frequent phenomenon in this ecosystem because of the steep mountain chain to the North and heavy precipitation concentrated in a 4-month wet season. Large herbivores which feed heavily in these dense near-monotypic stands would be expected to reach high local densities.

Avoidance of heat stress, nutritional requirements, and predator densities constrain habitat selection in large ungulates. Rhinos average 8 hour/day in wallows or streams during August and September, the period of peak daily relative humidity. Wallowing occurs for at least 1 hour/day in every month except December and January. Thus, open water is crucial for rhinos most of the year.

Agriculture in former rhino habitat has resulted in serious crop depredation. However, past studies suggest that high densities were



not related to the proximity of agriculture fields as densities in grasslands away from croplands exceeded or equaled to those densities in blocks bordered by croplands. However, densities in the eastern block, where rhino habitats are comparatively small, fluctuated seasonally with the ripening of rice, corn, wheat, and lentils grown in the adjacent fields.

#### REINTRODUCTION

Between 1986 - 1991, 38 rhinos were translocated from Chitwan to the Royal Bardia National Park. Although majority of them have contained their movements in the park, 2 animals move frequently in and out of the park. Of this introduced population, 3 have been killed by the poachers. It is yet to be seen how their population react and adapt to the new environment and with the other ungulates and human settlements.

In 1984, the Indian Government translocated 5 rhinos from Pobitora Sanctuary, Assam, to Dudhwa National Park, Uttar Pradesh. In addition, Nepal provided 4 rhinos from Chitwan. Both these operations had four casualties, resulting in 2 deaths in each operation.

## RHINO POACHING

Since the establishment of the Royal Chitwan National Park, a total of 109 rhinos died, 80% of which were from natural death and 20% from poaching in a span of 18 years (1973 - 1991). A spurt in poaching was noticed in 1992 when 9 rhinos were poached to death and 3 rhinos died of natural death. The recent surge in the smuggling of rhino horns out of the country into the southeast Asian markets, has activated rhino poaching in Nepal's protected areas.

The Department of National Parks and Wildlife Conservation realizes that laws and enforcement alone are not sufficient to curb the poaching of protected wild species and the cooperation of the people who live closest to them may provide a strong likelihood to counter the wildlife trade in and outside the protected areas. The Department has made efforts to control poaching by forming anti-poaching units with village-level informants. In January, 1993, eleven persons were arrested with evidence suggesting the strategy works. However, these units are poorly equipped -- no vehicles, no communication equipments and no firearms. The Park awards village informants up to the amount of Rs.50,000. Penalties for poaching rhinos are 5 - 15 year imprisonment with a fine of Rs. 50,000 - 100,000.

The Department also will seek to impose stringent trade restrictions and surveillance at the major custom posts in Nepal. Furthermore,

the Department will make a formal effort to go beyond the realm of political frontiers and will consolidate with Indian counterparts to ensure survival of the threatened wildlife species. It has also realized that only cohesive steps at multi-national level will effectively address such illicit international markets which are far-reaching, wide-flung, and rival those of illegal drugs and arms.

#### ACTION PLAN

The strategies of rhino conservation in Nepal is to ensure long-term viability of the one-horned rhino throughout its range, while minimizing conflict with people. Such objectives have to be achieved while continued increase in human population, economic influence of development on natural areas, and the need for land for agriculture and settlement.

It will not be possible to save Nepal's every rhino in terms of physical protection, but losses can be kept to a minimum if economic development plans take into account the needs of threatened wildlife species, and planning for conservation takes into consideration the needs of local people. Conservation of the rhino depends on the political will and concerted action of the government and people. Without political will and commitment, application of the conservation recommendations outlined here will be difficult

although they are based on sound ecological, economic, and cultural arguments.

1. Rivers and Flood Plain Grasslands

Viewed on a regional scale, rhinos probably spread along the flood plains at the base of the world's highest mountain range because of the presence of the highly productive but low diversity grassland community that flanked South Asia's major river systems. It is unclear to what extent recent deforestation in the Himalaya has intensified floods. However, the flood levels and extent of erosion in the plains increase every year. Aerial photographs from 1968 offer little resemblance to the current distribution of river courses, channels and grasslands along the Narayani River. Changes in the courses of these rivers could destroy the rhino's habitats, and the human population pressure on the surrounding land is such that alternative refuges are scarce.

The future of rhino population is in conflict due to other external factors which continues to deteriorate the environment outside the park, in particular the water development in the Rapti River which will reduce water base flows and impact base flow variations. Such development is considered to be detrimental to the sensitive flood plain grasslands of the Park. Intensified economic activity in the immediate park vicinity may add to the problem through increased groundwater

and river flow abstraction for irrigation. Increased water demands for domestic use and small-scale industries are foreseen. Thus, the cost of maintaining floodplain grasslands in the Park area under protection will increase. However, based on flood-plain dynamics, indicator communities or key phenomena that will reflect broader ecological trends of the flood plain grasslands, need to be monitored with a focus to those sensitive to water quality and quantity.

2. National and International Corridors

As it is not realistic now to establish new, sufficiently large protected areas, exploration to determine existing habitat corridors should be investigated between protected areas. Existing habitat corridors may facilitate range extension and migration later between protected areas. Land use planning should recognize such vital corridors and routes, and protect them from incompatible forms of development and settlement. Maintenance of critical habitats in such areas, will minimize conflicts between rhinos and people. It will also prevent the isolation of groups and improve the genetic viability of the overall population.

International cooperation is required where corridors and routes cross frontiers. It is particular that the such areas are not disrupted, or very serious conflicts between rhinos and people may result. The frequent movements of rhinos from Nepal

(Royal Bardia National Park) into India and rhinos from India (Dudhuwa National Park) into Nepal corroborates such conservation action.

Nepal should explore potentials for introducing rhinos in existing protected areas to re-establish their historical range. Such areas need to be of sufficient size and ecological diversity to accommodate potentially-growing populations of one horned rhinos because maintaining a Minimum Viable Population does not necessarily means surety from natural hazards and stochastic events. Thus, the objective should be to maintain several rhino populations within protected areas, wherever possible.

### 3. Mitigating People-Rhino Conflicts

Ideally, protected areas should provide for rhino needs so that the stimulus to move elsewhere is minimized. However, in present conditions, conservation initiatives for rhinos have conflict with human interests. Depredation of crops costs hundreds of thousands of Nepalese Rupees. The rhino will only be accepted by local people only when if its impact on human interests can be minimized or the damages are compensated by some social advancements. Limited compensation and insurance for crop damage may be organized but compensation has created numerous problems to conservation. Therefore, it is not a permanent solution.

Rhinos movement can be controlled by the use of barriers of various kinds to exclude them from areas used by people or to keep them in reserves. Natural barriers are to be preferred, such as belts around cultivated fields having laterally-furrowed trenches. Alternatively, potential exists to distract them by not growing crops which would not attract rhinos. A man-made belt of land unfavorable to rhinos may help to minimize conflict with people. Such barriers like trenches, high voltage electric fence, and steep-sided canals which rhinos cannot enter, are effective. Thus, establishing and maintenance of man-made barriers to protect people and their crops should be supported in the form of social compensation.

Rhinos cause substantial damage to agricultural crops particularly if the cropland is adjacent or near grasslands or a riverain forests. Even those crops which are not used by the rhinos are often destroyed by trampling during the rhino journey. The conservation of rhino would require not only protection of its habitat but also in fostering positive attitude particularly among local people, who resides next to the habitat of the rhinos. Attainment of such is achieved through institutional disposition.

#### 4. Control of Poaching

Poaching for rhino horns is primarily a threat to rhinos, and thereby to the population. Adequate staff, funds, and

equipments should be allocated to anti-poaching units. The Department envisions a long-term and extensive approach by emphasizing local involvement and cooperation to reduce the supply activities of the trade. This approach may even utilize the knowledge of poachers by providing local employment to them to counter the offense quickly. The Department strategy will involve: 1) Strengthening of the present system of anti-poaching unit, 2) Establishment of network communication between local communities and the park management, 3) Establishment of Awards and Incentives for local communities and park staff who will contribute to the campaign to save the wildlife, 4) Education, Awareness and communication, and 5) Workshops and training for the both government and non-government agencies connected with regulating the wildlife trade in Nepal.

#### 5. Trained Manpower

It might appear that the number of protected areas taken in conjunction with rhino conservation has ensured the survival of a substantial number. However, the protection and management of these areas depends very much on the availability of trained personnel and adequate financial resources, both of which are less than insufficient. As a result, there is a wide discrepancy in the degree of protection.



## RECOMMENDED ACTIONS

1. The integrity of present reserves containing one horned rhinos should be maintained and their areas extended where possible to cover seasonal movements. This will require a network of well managed flood plain grasslands and carefully designed multi-use zones, aimed at meeting the needs of local people without jeopardizing wildlife resources.
2. The ecological relationship between river flow, groundwater level and grassland maintenance with a specific focus that will increase landscape diversity and grassland biomass production, shall be determined with development of a detailed long-term program to monitor the ecological system of the Park. The grassland areas bordering the Rapti River and the water required to maintain its diversity, are vital for rhino conservation. This plan should also identify the pesticides used in the area and elaborate on their potential toxicity.
3. Resources should be provided to strengthen anti-poaching measures. This is specially important as slaughter of rhinos will damage the genetic composition of the rhino population.
4. Core rhino habitats should be given both legal and long-term physical protection. Enlargement of existing protected, and the creation of buffer zones should be employed where possible,