

The Greater One-horned Rhinoceros Conservation Action Plan for Nepal (2006 - 2011)



Government of Nepal
Ministry of Forests and Soil Conservation
Department of National Parks and Wildlife Conservation
Kathmandu, Nepal
2006





Department of National Parks and Wildlife Conservation

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Government of Nepal
Ministry of Forests and Soil Conservation
Department of National Parks and Wildlife Conservation



Supported by
WWF Nepal



Gopal Rai

Minister of State

Ministry of Forests and Soil Conservation

Singha Durbar, Kathmandu, Nepal.

Foreword

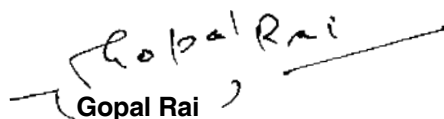
Over the past decades, the Government of Nepal has shown great dedication to conservation and safeguarding endangered wildlife. The principles stated in the National Biodiversity Strategy, 2002 along with Convention on Biological Diversity and the Convention on International Trade in Endangered Species of Wild Fauna and Flora all exhibit, a conducive environment for biodiversity conservation.

The Greater One-horned Rhinoceros is perhaps the most enduring emblem of Nepal's rich biological heritage. Not only is it important to conservationists for its ecological value but it also holds a universal appeal for ordinary people. In recent years, rhino poaching has been one of the major threats for the survival of this species. However, Government of Nepal is, to the extent possible, dedicated to conserve this animal for now and for future generation.

In recent days, the occasional death of rhino has alerted us. This has made the Government of Nepal together with wide range of stakeholders drew up the Greater One-horned Rhinoceros Conservation Action Plan to put effective measures in place. It reflects our commitment to a more cohesive, Participatory and proactive role towards conservation of this species and its habitat.

In this regard, I would like to extend our sincere thanks to all our partners and stakeholders in conserving rhinoceros till date. The Government would like to seek their continuous support in implementing this Action Plan through financial, technical and social means.

I am confident that this Action Plan will contribute in conserving and managing rhinoceros and its habitat more effectively and efficiently in the days to come.


Gopal Rai

Honorable Minister of State



Government of Nepal
MINISTRY OF FORESTS AND SOIL CONSERVATION

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Foreword

Nepal has shown great commitment to the conservation of its rich biodiversity and the survival of flagship species like Greater One-horned Rhinoceros for over four decades. Of equal significance are Nepal's policies on wildlife conservation, which are considered to rank among the most participatory in their implementation in the world. Despite these concerted efforts and achievements, many wildlife species, particularly the rhino, is still endangered.

Rhinos are precious gift of nature not only for us but also for our future generation. Of many challenges to the long-term survival and conservation of rhinos, none is more dangerous than the organized international trade in rhino horn that encourages rampant poaching. It is one of the key threats addressed in the Rhino Action Plan prepared by the Department of National Parks and Wildlife Conservation with support from its conservation partners and endorsed by the Government of Nepal.

Government of Nepal greatly acknowledges the contribution of wildlife conservation partners and request for their continuous support for the implementation of this plan for the benefit of mankind and our environment. I would also like to emphasize the role of local communities in its implementation. The responsibility and stewardship of this magnificent species lies with each of us. Without our active participation and contribution, the Greater One-horned Rhinoceros will not survive in our great floodplains and the Terai forests.

Finally, I would like to thank all the individuals and organizations involved in shaping of this document and affirm the commitment of the Ministry to save the Greater One-horned Rhinoceros.

Damodar Prasad Parajuli, PhD
Acting Secretary



Government of Nepal
Ministry of Forests & Soil Conservation
Department of National Parks & Wildlife Conservation



Preface

The Greater One-horned Rhinoceros faces tremendous pressure for its survival as more of the fertile Terai, especially the Chitwan valley, changes to human settlements. The rapid conversion of prime rhino habitat into agricultural land coupled with a high demand for rhino horns has made serious inroads into the remaining rhino population.

In the past few decades, various efforts have been implemented for the conservation of this endangered species by the Government of Nepal and other partner organizations, yet we have still yet to guarantee the safety of its long-term survival. While encroachment of rhino habitat, decrease in grassland and food competition with livestock are a few enduring threats, a growing concern in recent years has been poaching fuelled by the international illegal wildlife trade. The political instability and the insurgency of the past decade also added to the conservation challenges.

It is imperative, now more than ever, for Nepal to put appropriate policies and action plans into action for the long-term conservation of rhinos. We may lose the rhino population of Nepal if we fail to act on time. In this context, the Greater One-horned Rhinoceros Conservation Action Plan is an important step to holistically address the issues and chart out a plan.

The plan in itself cannot ensure the survival of rhinos. Its implementation is the responsibility of all stakeholders. The financial aspect of rhino conservation is something that we cannot afford to ignore and I urge renewed and greater contributions from donor agencies at this juncture. Without this vital support, the actions proposed in the plan cannot be executed and will remain mere words.

I would like to thank Mr Shyam Bajimaya, Mr Shiv Raj Bhatta and Dr Shant Raj Jnawali for taking the responsibility of preparing such an important document to save the rhinos of Nepal. I would also like to thank those who provided valuable inputs as well as those who supported the team directly or indirectly. Last but not the least, my thanks to WWF Nepal for their support in the preparation of this document.

Narayan Prasad Poudel
Director General



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Message

WWF, the global conservation organization, has worked for the conservation of endangered species in Nepal since 1967. We supported the Government of Nepal in its conservation efforts and substantial successes were achieved in bringing endangered species of fauna back from the brink of extinction. The Greater One-horned Rhinoceros is a notable example; its population increased from less than one hundred in the late 1950s to more than 600 in the late 1990s.

Path-breaking conservation accomplishments were made through collaborations with the Department of National Parks and Wildlife Conservation and other partner organizations. It was a privilege for WWF to be a part of initiatives like Rhino Translocations and Rhino Counts.

In the past, WWF focused primarily on the conservation of endangered species but by the 1990s our approach shifted from site-specific to the landscape level resulting in the Terai Arc Landscape. This joint initiative of the Government of Nepal and WWF Nepal creates additional habitat for mega species and also provides livelihood opportunities for local communities.

Despite the strides made in rhino conservation, the future of the species is still under threat. The Greater One-horned Rhinoceros Conservation Action Plan will enable us to tackle the challenges in the best possible way. This plan, prepared and approved by the Government of Nepal, envisages future policies, plans, and strategies.

Our thanks go to the Government of Nepal for giving us the opportunity to contribute to conservation in Nepal. We are especially grateful to the team led by Mr. Shyam Bajimaya that completed this plan. WWF Nepal assures continued cooperation for conservation and expresses confidence that the Greater One-horned Rhinoceros will survive and thrive in the forests of Nepal if all work together.

Chandra P. Gurung, PhD
Country Representative

Acknowledgements

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First and foremost we would like to extend our sincere thanks to the Department of National Parks and Wildlife Conservation for allowing us to prepare the Greater One-horned Rhinoceros Conservation Action Plan of Nepal and WWF Nepal for providing financial support.

We would also like to sincerely thank Mr. Narayan Prasad Paudel, Director General of Department of National Parks and Wildlife Conservation (DNPWC) and Dr. Tirtha Man Maskey, former Director General of DNPWC and Co-Chair of AsRSG for encouraging in taking this initiative. Dr. Chandra Prasad Gurung, Country Representative, Mr. Anil Manandhar and Dr. Sarala Khaling from WWF Nepal deserve special thank for their support. In addition we would like to thank Mr. Ukesh Raj Bhuju for his contribution. We would like to thank wardens and park staffs for their contribution in preparing this document. Finally, we acknowledge the contribution to the Greater One-horned Rhinoceros Action Plan made by Mr. Kanchan Thapa, Mr. Gokarna Jung Thapa and Ms. Trishna Gurung in the final preparation of this document.

The reviewers Dr. Tirtha Man Maskey and Dr. Prahlad Yonzon also deserve our special thanks for their valuable comments. Finally, we would like to thank Mr. Narendra Man Babu Pradhan and all those who have provided valuable suggestions and comments to improve this document.

Team members:

Mr. Shyam Bajimaya
Mr. Shiv Raj Bhatta
Dr. Shant Raj Jnawali



Acronyms

APU	Anti Poaching Unit
AsRSG	Asian Rhino Specialist Group
BCC	Biodiversity Conservation Center
BCP	Bardia Conservation Project
BICP	Bardia Integrated Conservation Project
BNP	Bardia National Park
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CNP	Chitwan National Park
CR	Critically Endangered
DNPWC	Department of National Parks and Wildlife Conservation
DoF	Department of Forests
EN	Endangered
EX	Extinction
GEF	Global Environment Facilities
GTF	Global Tiger Forum
INGO	International Non-Governmental Organization
ITNC	International Trust for Nature Conservation
IUCN	World Conservation Union
KMTNC	King Mahendra Trust for Nature Conservation
MFSC	Ministry of Forests and Soil Conservation
NGO	Non-Governmental Organization
PCP	Participatory Conservation Program
PHVA	Population Habitat Viability Analysis
PWR	Parsa Wildlife Reserve
SNV	Netherlands Development Organization
SWR	Suklaphanta Wildlife Reserve
TAL	Terai Arc Landscape
TRCP	Tiger Rhino Conservation Project
UNDP	United Nations Development Program
USAID	United States Agency for International Development
VDC	Village Development Committee
VU	Vulnerable
WETTREC	Western Terai Tiger, Rhino, Elephant Complex Project
WTLBP	Western Terai Landscape Building Program
WTLCP	Western Terai Landscape Complex Project
WWF	World Wide Fund for Nature

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Executive Summary



The rhinoceros are of special interest for conservation for their role in maintaining the terai biodiversity. The purpose of this Greater One-horned Rhinoceros Conservation Action Plan is to emphasize on what needs to be done to conserve the species *Rhinoceros unicornis* in perpetuity. The Government of Nepal has embraced conservation initiatives in or beyond the protected areas in favor of maintaining viable populations of rhinoceros.

Rhino translocation has been successful conservation initiatives conducted by Government of Nepal in collaboration with WWF Nepal and KMTNC. A total of 87 rhinos were translocated from Chitwan National Park (CNP) to Bardia National Park (BNP) and Suklaphanta Wildlife Reserve (SWR) from 1986 to 2003 in an effort to establish viable rhino populations in other protected areas.

Several studies on rhinos had revealed that the population had increased gradually pertaining to effective anti-poaching operation and intelligence network in the period 1975-2000. The Count Rhino-1994 estimated a population size of 466 individuals with an increase to 544 individual in Rhino Count-2000 in CNP. This increase in number of rhinoceros proved that population can rebound vigorously when sufficient habitat and protection are provided.

In last few years, Nepal witnessed a colossal loss in wildlife richness particularly large mammals like rhinoceros due to disappearance of most of the alluvial plain grassland habitat combined with poaching for its commercially valued horns. The rhino poaching has been fluctuating over time and had surged in 2002. This had been reflected in recent Rhino Count-2005 which has estimated rhino population size of 372 individual in CNP from 544 individual in 2000. Currently, rhino population size is estimated at 446 individuals in three terai protected areas of Nepal.

Since protection of rhinoceros and their habitats is indeed imperative for long-term conservation, the action plan incorporates the Asian Rhino Specialist Group's (AsRSG) recommendations for the conservation of rhino as a species and a component of ecosystems. To respond to the threats to wild populations; monitoring, habitat maintenance and efforts to establish new wild populations through translocations are underway. A timely decision in forming Anti-poaching operations and providing rewards to the informants will help in combating rhino poaching in Nepal.

Over the period, the rhino population had led to the food competition with the livestock leading to increase in crop depredation. This had increased the

incidents of local harassment and crop damage and has created conflict between the local people residing in the buffer zones. The implementation of buffer zone through community participation in local development will certainly bring positive attitudes among local people toward biodiversity conservation.

Rhinoceros has always been in demand from zoos and research stations. To transpire a scientific basis for rhino conservation, a long-term research and monitoring program should be initiated. Similarly, different conservation awareness programs need to be implemented in cooperation with the buffer zone institutions, local NGOs and other relevant organizations.

In addition, to increase the efficiency of park staff in rhino conservation, specific training should be provided on regular basis for enhancing their skills and capabilities. Also, Nepal is promoting transboundary cooperation with her neighboring countries for the protection of wildlife and controlling illegal trade on wildlife. Therefore, a regional and international collaboration will be always necessary for effective conservation of rhinoceros in the range states.

However, financial resources have always been the limiting factor in implementing effective conservation program in future. A mechanism for mobilizing funds obtained from exchange program should be developed for creating a sustainable funding in rhino conservation.

The Action Plan consists of Executive Summary, Goal, Introduction, Background, Current Status and Distribution, Current Opportunities for Rhino Conservation, Action Plan Framework, Literature Citation, lists of Figures and Tables along with Foreword, Preface, Message, Acknowledgements and Acronyms. The Action Plan Framework is as follows:

Objective 1: Continue study on rhinoceros biology and their habitat, and establish database with monitoring system

Objective 2: Habitat expansion through rehabilitation/restoration of identified priority rhino habitats

Objective 3 Reintroduce rhinos to create at least viable population

Objective 4: Improve rhino-human relationship through buffer zone development and conservation education

Objective 5: Strengthen anti-poaching capability

Objective 6: Build institutional capacity

Objective 7: Limit transfer of Rhinos for *ex-situ* conservation from wild populations

Objective 8: Strengthen national, transboundary, regional and international collaboration

Objective 9: Ensure sustainable funding to implement the rhino conservation action plan

Goal

The purpose of this Greater One-horned Rhinoceros Conservation Action Plan is primarily to emphasize on *in-situ* conservation or what needs to be done to preserve the species *Rhinoceros unicornis* in perpetuity and reinforce the continuing recovery of rhinoceros populations in Nepal. The Government of Nepal shall embrace conservation initiatives beyond protected areas in favor of maintaining viable populations of rhinoceros in CNP, BNP and SWR.

Since the protection of both animals and their habitats is indeed imperative for long-term conservation, the action plan incorporates the Asian Rhino Specialist Group's (AsRSG) recommendations for the conservation of rhino as a species and as a component of their ecosystems, and aims to:

1. Maintain at least wild viable populations of rhinoceros and their

habitats in CNP, BNP and SWR;

2. Develop local guardianship through conservation awareness and Buffer Zone development programs;
3. Respond to threats mainly poaching for long-term conservation;
4. Continue efforts locally, nationally and internationally to stop the illegal trade in rhino horns and their products;
5. Continue scientific studies and monitoring of wild rhino populations;
6. Continue efforts to expand wild populations of rhinos through translocations;
7. Develop human resource in wildlife management with an emphasis on enhancing capacity to census, monitor and manage rhino populations; and
8. Support to maintain a captive population capable of long-term viability to guard against any unforeseen extinction of the wild population.



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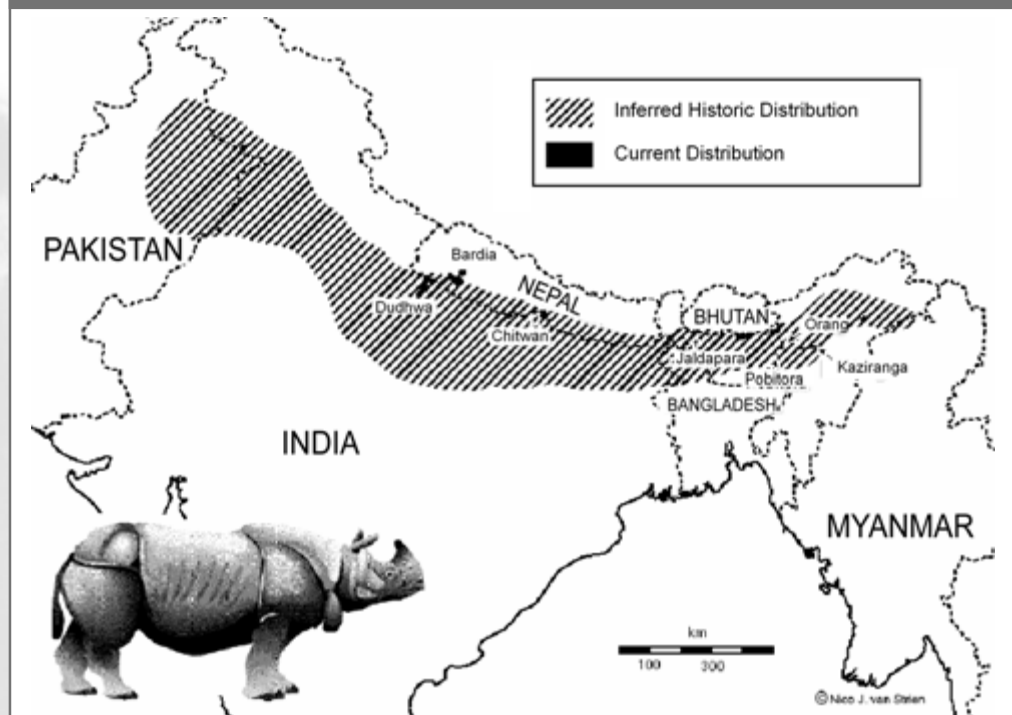
Introduction

Once the Greater One-horned Rhinoceros (hereafter referred to as rhino or rhinoceros) were commonly ranging throughout the northern floodplain and nearby foothills of the Indian sub-continent between Indo-Myanmar border in the east and Sindhu River basin, Pakistan in the west (Fig 1). Destruction of apropos habitats combined with poaching has led these animals to

limit themselves to a few isolated pockets of protected areas of India and Nepal. Today only about 2,480 rhinoceros survive in the wild and about 136 in captivity (IUCN 1997).

The rapid growth of human population has attributed to the gradual elimination of many large mammals from their historical range. The chief reason being the loss of

FIG 1: Asian Greater One-horned Rhinoceros - History and Present Distribution



their prime habitat. In last few decades, Nepal witnessed a colossal loss in wildlife richness particularly large mammals due to habitat deterioration. The conversion of forestland into other land use has constricted and fragmented wildlife habitat eventually threatening the life support system of many species.

In Nepal, the huge reduction in rhino population is primarily ascribed to the disappearance of most of the alluvial plain grasslands and massive poaching for its commercially valued horns. The rhinoceros were confined to CNP until 1980s. The government's efforts for conserving rhinoceros through the establishment of CNP, implementation of buffer zone program and translocation of rhinos to other protected areas has remarkably improved the prospect of

rhinoceros in Nepal. The population of rhinoceros in CNP has increased significantly and they are protected from natural or any other disasters by creating a second viable population in BNP and SWR.

By now three Terai protected areas namely CNP, BNP and SWR contain rhinoceros. Furthermore, small patches of alluvial plains in those protected areas face a danger that could change the course of vegetation succession to a climax condition unsuitable for large mammals like rhino. Therefore, Terai protected areas can provide shelter to rhinoceros in the long-term if such areas are left undisturbed from increasing human interference and unplanned development programs.





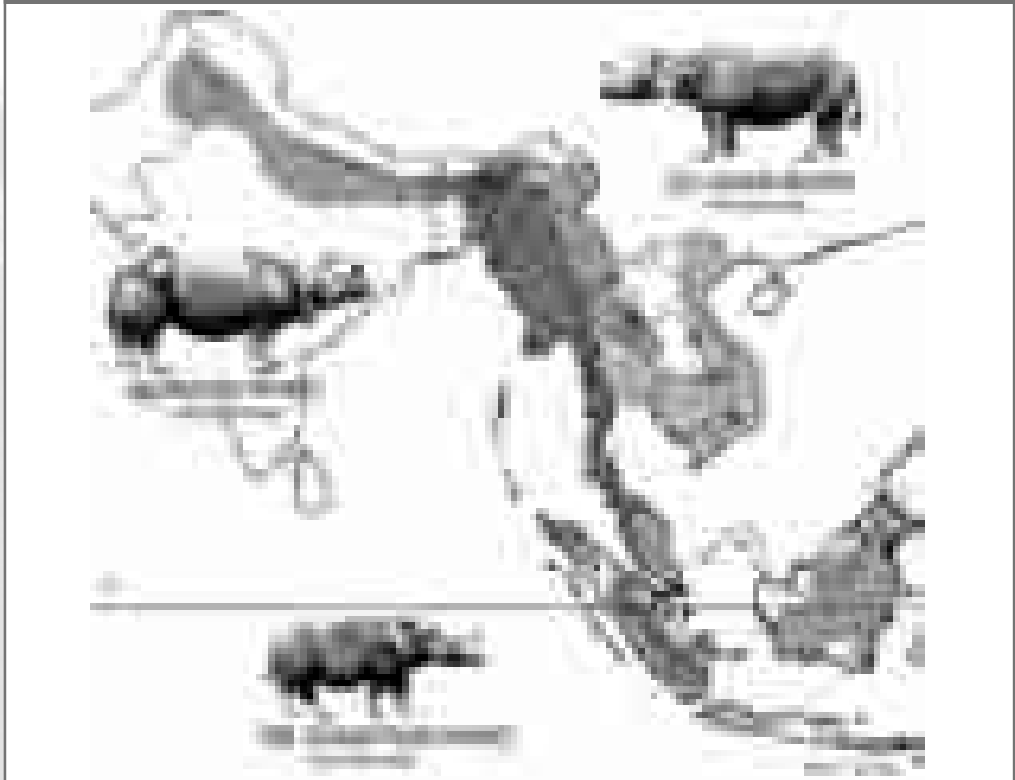
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Background

The family Rhinocerotidae includes five species of rhinoceros remaining in the world. The Greater One-horned Rhinoceros *Rhinoceros unicornis*, Javan Rhinoceros *Rhinoceros sondaicus* and Sumatran Rhinoceros *Dicerorhinus sumatrensis* are found only in South Asia and South East Asia where as the White Rhinoceros *Ceratotherium simum* and Black Rhinoceros *Diceros bicornis* now inhabit mainly in South and

Western Africa (Fig.2). Once abundant in Asia and Africa rhinoceros are now battling for their survival due to heavy poaching and destruction of suitable habitats. Two rhinoceros recorded in early 1990s in Indo-Pakistan border are reported to have been extinct. Despite joint efforts between Bhutan and India, survival of a small population of rhinoceros living along Indo-Bhutan border in Manas still remains doubtful (Jnawali *et.al* 2000)

FIG 2: Historic Distribution and Current Number of Asian Rhinos



In Nepal, rhinoceros population was estimated at ca 1000 individuals until 1950 in the Chitwan valley. The valley was well protected by the then Rana rulers for sport hunting. The area was also protected from outsiders since malaria was prevalent in the valley. Only indigenous communities like *Tharus* who were known to be immune to malaria were residing in the valley. The impact of their presence on valley's natural environment was negligible.

After the collapse of Rana regime in 1950 and eradication of malaria during mid 1950 Chitwan valley was opened for outsiders for settlements. Hundreds of thousand people from mid-hills were attracted by highly fertile land in Terai and large chunks of wildlife habitats were cleared for human settlement, agricultural expansion and other development activities. This not only destroyed natural forest but also severely affected wildlife population since illegal killing of wild animals was prevalent as early as in mid 1950s. Poaching of wild animals mainly affected large mammals including rhinoceros. As a result, rhinoceros

population dropped down to less than 100 individuals during late 1960s (Adhikari *et al* 1999)

Realizing the need to halt the rapidly declining rhinoceros population, Nepal established "*Gairda Gasti*", an armed Rhino Patrol Unit in 1961 and then declared the remaining prime rhino habitats of about 544 sq. km along Rapti, Narayani and Reu rivers as CNP in 1973. The park was later extended to encompass a total area of 932 sq. km. and then listed as "World Heritage Site" in 1984 for its high biological diversity. Now, Nepal's protected area system covers over 19.42% of country's area including 9 national parks, 3 wildlife reserves, 3 conservation areas, 1 hunting reserve and buffer zones for 6 national parks and 3 wildlife reserves (Fig. 3). Presently, three of the five Terai protected areas encompassing an area of 3,526.50 sq. km. harbor 446 rhinoceros (Fig 4). The Government of Nepal has streamlined the biodiversity conservation program of the country and shown firm commitment for the conservation of biological resources by approving Nepal Biodiversity Strategy

Some of the major and common conclusions of the PHVA process for various rhino species conditions

1. Any rhino population under 10 individuals is at high risk of extinction even under ideal conditions;
2. To maximize probability of survival under all kinds of identifiable risks, populations of 100 or populations that can be rapidly expanded to 100 or more individuals, seems advisable;
3. To avoid the risks of having "all the eggs in one basket", at least five or more populations of 100 or more individuals are recommended for each regional variety of rhino considered distinct enough to be conserved as a separate taxon.
4. For long-term viability a total population of at least 2,000 to 3,000 rhino of each taxon seems highly desirable.

(Verbatim from Asian Rhinos, Status Survey and Conservation Action Plan)

FIG 3: Map of Protected Areas of Nepal



in 2002. The Ministry of Forests and Soil Conservation approved a 10 year Strategic Plan of TAL in 2004 and its Implementation Plan in 2006. This strategic plan mainly covers the habitats of mega fauna like rhinoceros.

After a successful effort of the DNPWC and its partners, declining population of rhinoceros began to stabilize gradually. The increase in number of rhinoceros since late 1960s in Chitwan demonstrate that population can rebound vigorously when sufficient habitat and protection are provided. It provides an example of a population that was almost in the verge of extinction while still maintaining high genetic diversity.

Eric Dinerstein and Gary McCracken (1990) suggested that the high heterozygosity is a consequence of the large population prior to 1950 and long generation time on average. The present rhinoceros have retained 90% of the heterozygosity of the original population going back to 1400 A.D. Given the accelerating rate of extinction, endangered species like *R. unicornis* which were, until recently, common and widespread, may yet retain a substantial proportion of their original heterozygosity.

The first translocation of this pachyderm from CNP to BNP was done in 1986 and several translocations of rhinoceros were conducted in subsequent years in order to create viable populations in BNP and

SWR in an effort to establish a sub-population and further safeguard the species against natural calamities such as disease, flooding, etc. Several studies on rhinoceros and their habitats have been conducted in the past years and monitoring of translocated rhinoceros is regularly conducted in BNP and SWR.

In 1994, for the first time, DNPWC in collaboration with the King Mahendra Trust for Nature Conservation and

Resources Nepal supported by WWF Nepal launched a Count Rhino in CNP and estimated a maximum population size of minimum 466 individuals. Similarly, the DNPWC in collaboration with KMTNC and WWF Nepal counted a total of 612 rhinos in Nepal in 2000 (Fig.5). In 2005, a Rhino Count Program was conducted by the DNPWC in collaboration with KMTNC and WWF Nepal where 372 rhinos were recorded in CNP.

FIG 4: Map of Rhino Habitat in Terai Protected Areas





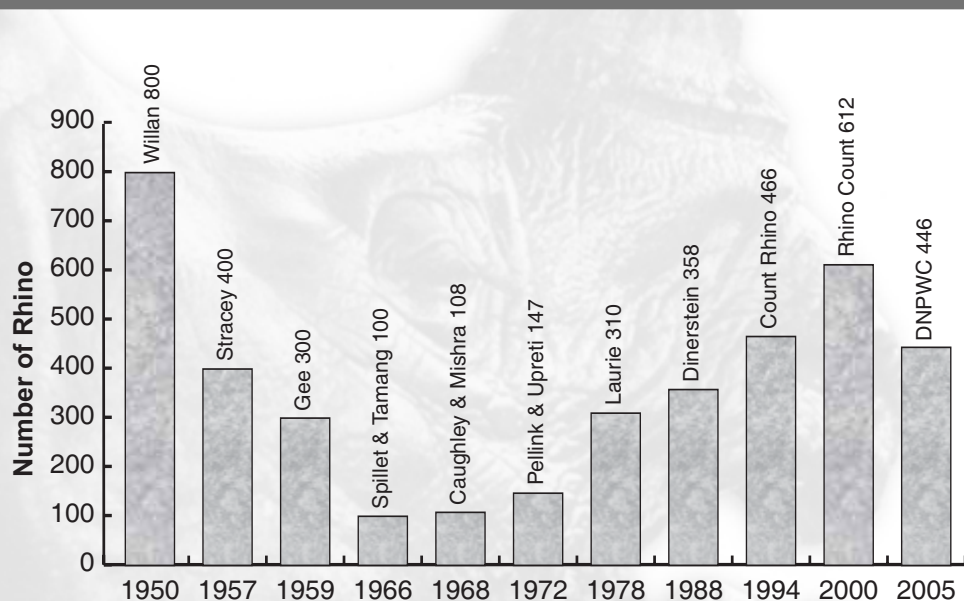
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Current Status and Distribution

Of the total rhino population, 447 individuals are in Nepal and ca 1,649 is restricted in Kaziranga National Park, Assam, India (Asian Rhino Specialist Group Meeting 1999 and DNPWC Report 2000). The studies have revealed that the population has increased from merely less than one hundred individuals to an estimate of 270-310 individuals in total by 1975 (Laurie 1978). By 1988, the population increased to reach a total of 358 rhinoceros (Dinerstein and Price 1991).

It was found that growth in rhino population in CNP is 104 since 1994 (taking minimum data of '94 Census), which comes an annual increment of 3.8 %. The translocated 14 rhinos were not included in this census as well as 8 dead rhinos in 2000/01 were also not included. The census number is encouraging in the sense that since 1995 nearly 99 rhinos were recorded dead in Chitwan by various causes according to the DNPWC records. The rhinoceros populations of India and Nepal are still in endangered list based on the IUCN criteria (Table 1)

FIG 5: Population Trend of Rhinoceros in Nepal



Source: Dr. T.M. Maskey

TABLE 1: Assessment of Asian Rhino Species by IUCN Red List Criteria

Greater One-horned Rhinoceros**		
IUCN Criteria*	Eastern population Assam, West Bengal	Western population Nepal
A. Population reduction	VU	VU
B. Extent of occurrence	EN	EN
C. Population estimate	VU	VU
D. Probability of extinction	VU	VU
Overall rating	EN	EN

*revised IUCN Categories and Criteria, approved by the 40th Meeting of the IUCN Council, 30 November 1994

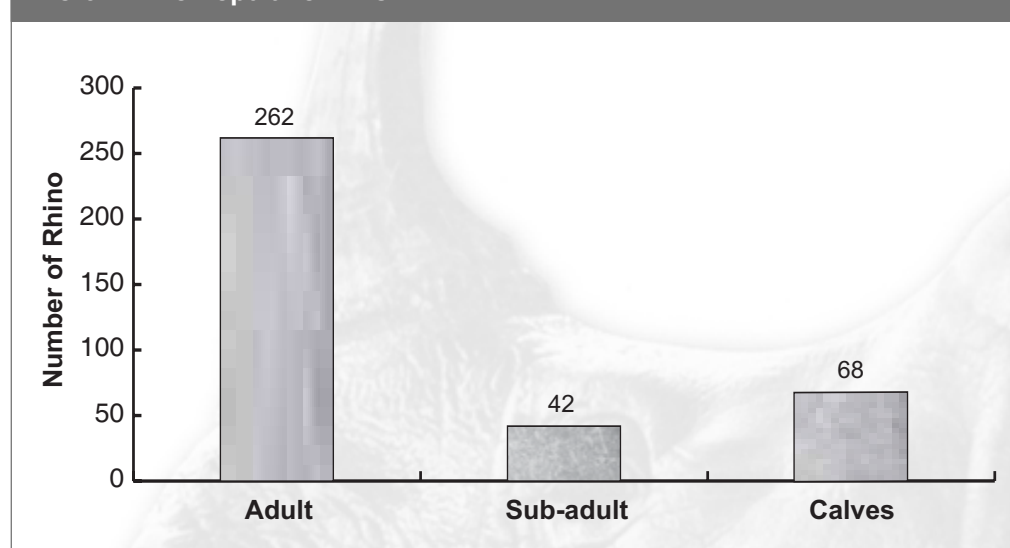
EX = Extinct CR = Critically Endangered EN = Endangered VU = Vulnerable

**Asian Rhinos, AsRSG, IUCN, 1997

TABLE 2: Population Estimates of Greater One-horned Rhinoceros in Nepal**

Name of Protected Area	Estimate Number of Rhino	Habitat Availability Presently/Potentially	Potential Carrying Capacity
Chitwan National Park	372	1,682	500
Bardia National Park	67	1,295	300+
Suklaphanta Wildlife Reserve	7	305	?
Total	446	3,282	

**Asian Rhinos, AsRSG, IUCN, 1997

FIG 6: Rhino Population in CNP

In 2000, the DNPWC in collaboration with KMTNC and WWF Nepal has counted a total of 544 rhinos in and around the CNP and 67 in BNP (DNPWC 2000). In 2005, the DNPWC in collaboration with KMTNC and WWF Nepal has counted a total of 372 rhinos in and around the CNP

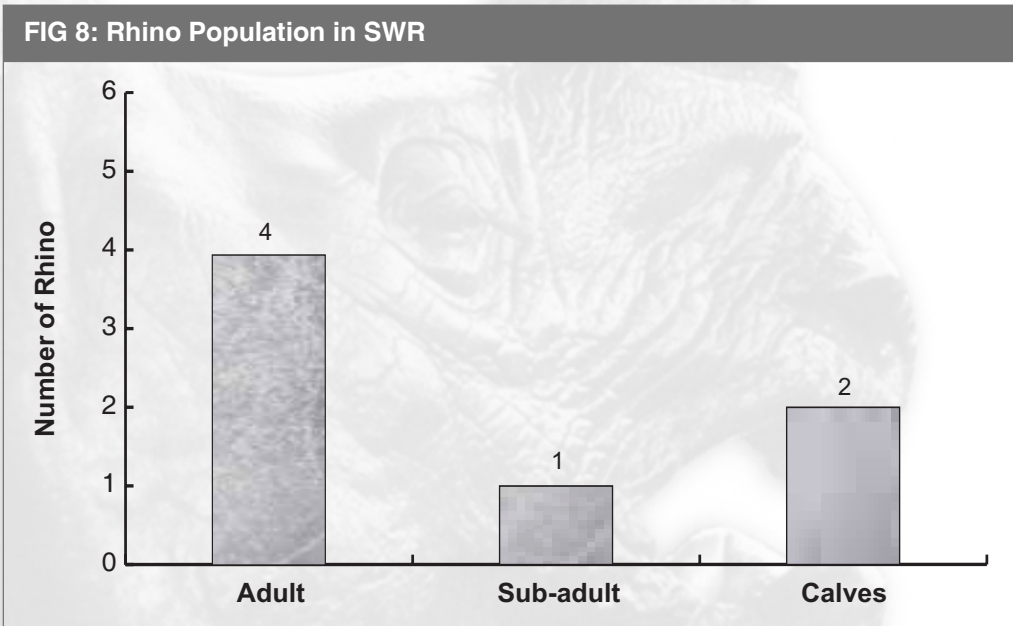
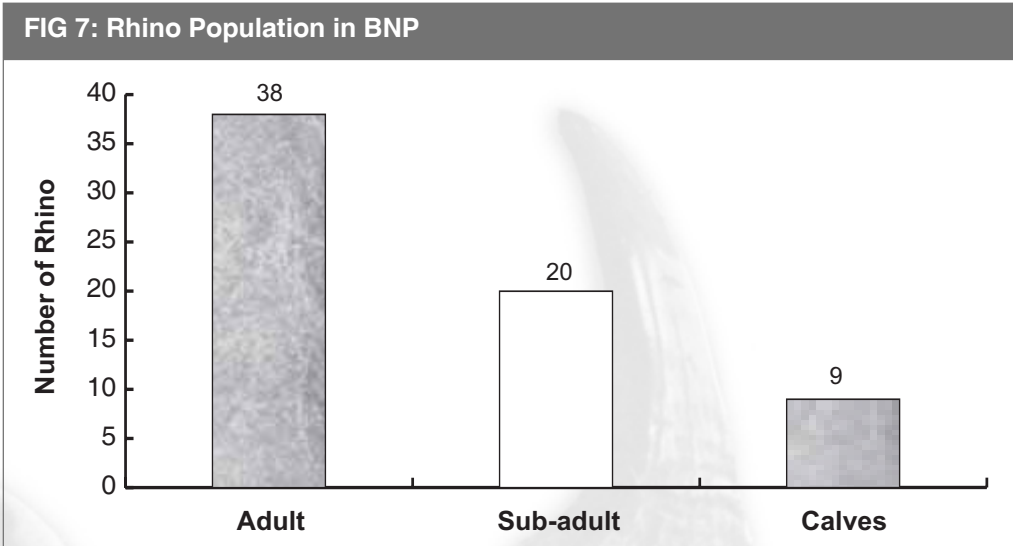
(DNPWC 2005, Fig.5). Among the direct counted 372 individuals in CNP; 262 were adults, 42 sub-adults and 68 calves (Fig.6). Among 67 rhinos in Bardia; 38 were adults, 20 sub-adults and 9 calves (Fig.7). Among 7 rhinos in SWR; 4 are adults, 1 sub-adult and 2 calves (Fig 8). According

to AsRSG report of 1997, target rhino population for Nepal is 800 individuals (Table 3) and the potential carrying capacity of CNP for rhino is ca.500 but

this figure has already exceeded in 2000, however, drops down to 372 individual in 2005 (Table 2).

TABLE 3: Overview of Current and Target Populations and Protected Areas for Greater One-horned Rhinoceros					
Greater One-horned Rhinoceros**					
Country	Current Population	Target Population	Current Number/ Size km² Areas	Target Number/ Size km² Areas	Remarks
Nepal	446	800+	2/1,000*	2+/1,000	*based on ~500 rhino pop.
India	~1,600	2,200+	9/2,000	10/2,500	
Asia	~2,212	3,000+	10/3,000	12/3,500	

** Asian Rhinos, AsRSG, IUCN, 1997



Mortality in Chitwan and Bardia



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With the establishment of protected areas and engagement of the Nepal Army in the park protection, poaching was brought under control for few years. From 1976 to 1983, poaching was virtually stopped in the park but from 1984 poaching surged again, as poachers became familiar with the park patrolling system. About 20 rhinos were killed between 1984 to 1991. In 1992, 18 rhinos were killed in the Chitwan valley. A timely decision was made to form Anti-poaching units and to provide rewards to the informants for controlling and combating particularly rhino poaching. The anti-poaching measure was effective to minimize the poaching.

However, from 1996, poaching activity increased again in Chitwan valley probably due to political instability, lapses in park patrolling, replacement of experienced APU staff, and the merging of armed *Gaida Gasti* (rhino patrol) with the Forest Guard. In 1990, the political system of the country changed affecting the government mechanism to a great extent. In 1993, the MFSC commissioned a working group comprising officials from the DNPWC, DoF, District Forest Officer, Chief Warden and Major from Nepal Army to assess the poaching problem in Chitwan and make recommendations for effective conservation of rhinoceros. The working team made several recommendations including not reducing

TABLE 4: Annual Rhino Mortality in CNP and BNP

Year	Mortality				Total
	CNP		BNP		
	Poaching	Natural	Poaching	Natural	
From May 1996	-	6	-	-	6
1997	1	5	-	1	7
1998	4	24	1	-	29
1999	9	21	-	1	31
2000	12	27	1	5	45
2001	14	7	-	3	24
2002	40	17	2	3	62
2003	20	25	9	1	55
2004	8	12	2	1	23
Total	108	144	15	15	282

Source: DNPWC Annual Reports

the number of guard posts in Chitwan and Nawalparasi and strengthening the intelligence network etc. In 1996 and 1997, a total of 12 rhinos were recorded dead in Chitwan valley of which only one was poached. The situation became worse with loss of 269 rhinos of which 122 were poached (45.3%) between 1998 and 2004 (Table 4). Several rhino poachers have been killed in encounters and number of persons has been apprehended in rhino poaching.

Different methods like pit digging, poisoning, wire noose with heavy spear were used in the past but now modern firearm and electrocution techniques are in use for killing rhinoceros. Maskey (1998) reported that 26.9% of rhino was poached in the valley from 1973 to 1998. The rhino mortality from poaching is over 39% for last two years (2000 & 2001) which is higher than for the period from 1973 to 1998 by 12%.



Rhino Habitat



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All five species of rhinoceros are true herbivores. Asiatic rhino species prefer to reside in alluvial flood-plain vegetation of sub-tropical climate where water and green grasses are available all year round. They are of special interest for conservation for their role in maintaining the Terai biodiversity. Their phylogeny, ecology and nutritional energetic have evolved around these grassland ecosystems.

Increased numbers of rhinos are apparent within blocks of the suitable rhino habitat in Chitwan. Rhinos occur in highest densities along the flood plain grasslands and riverine forests bordering the Rapti, Narayani, Reu, and Dhungra rivers suggesting floodplain grasslands as the single most critical habitat dominated by 4-6 m tall *Saccharum spontaneum* (Dinerstein and Price 1991). Grasslands interspersed with patches of riverine forests together make about 30% of the park area and are composed of *Saccharum spp.*, *Narenga spp.*, and *Themeda spp.* (Shrestha 1995). Due to the flood and vegetation succession the

grassland may have substantially decreased. This grass species is the fundamental food resource of rhinoceros comprising more than 60% of the animal diet. Sal *Shorea robusta* forest associated with species such as *Dillennia pentagyna*, *Syzigium cumini*, *Trijuga oleofera*, *Lagerstromia parviflora*, *Terminalia tomentosa*, *T. bellerica*, *Phyllanthus emblica* comprise 70% of the park area and are seldom used by rhinoceros.

Inundation by regular flooding of the alluvial plains along major rivers creates favorable condition for quick appearance of sprouts and germination to maintain the dominance of *Saccharum spontaneum*. Therefore the monsoon flood is very critical for maintaining rhino habitat. Oxbow lakes and other open water bodies are also very critical for rhino. Rhino spends about 8 hours/day in wallows or streams during the period of high humidity (August-September) but they spend at least an hour/day wallowing in December and January (Laurie 1978).



Reintroduction of Rhinoceros

As rhinoceros population increased in CNP, those that live along the park border enter nearby agricultural fields and raid crops. Besides, incidents of local harassment were also reported occasionally from the area. This has created conflict between the local communities inhabiting in the buffer zone and conservation of newly revived rhinoceros population in CNP.

A founder population of 13 rhinos was reintroduced from CNP to BNP in 1986. Most of the translocated females conceived shortly after they had been released indicating their acceptance of the released habitat. In 1991, 25 rhinos were translocated to the Babai valley, northeastern part of BNP. The rhinoceros population in BNP increased to 45 individuals by 1995, but population density of rhinos in the park is still low (0.3 animals/km²) compared to that of CNP (8-10 animals/km²). The translocation of rhinos to BNP should bolster in creating a viable rhino population (Jnawali, 1995).

Furthermore to strengthen the rhino population in BNP and as per the recommendations made by AsRSG meeting 1999, Nepal has translocated an additional batch of 4, 16, and 5 rhinoceros to Babai valley, BNP in 1999, 2000 and 2001 respectively. Four rhinoceros were translocated to SWR for the first time in November 2000. At present SWR consists of 7 individuals including two adult males, 2 females and 1 sub-adult of unknown sex and 2 newly born calves of unknown sex. DNPWC with the support of the conservation partners has translocated 10 more rhinos to Babai valley in March 2002 for the sake of building viable population in the area. Similarly in 2003, 10 rhinos were translocated to BNP from CNP. In addition, Nepal has provided 4 rhinos from CNP to Dudhwa National Park in 1984 and over 24 rhinoceros to different zoos in the world for *ex-situ* conservation of the species in the past years.

Current Opportunities for Rhino Conservation



Wildlife conservation in Nepal was initiated with the major focus on the endangered species protection and protected areas were created basically to conserve endangered species such as rhinos and tigers. Most of these protected areas were managed with little emphasis on human dimension in protected area management in the past. Overtime, protected area management approach has changed from protective to participatory and from species to landscape conservation. Nepal has always been in lead in involving people in conservation and even sharing park revenue for local community development residing in the buffer zone.

In 1993, the National Parks and Wildlife Conservation Act was amended with the provisions of Buffer Zone and sharing of the park revenue (30 - 50%) for community development and conservation activities. The Buffer Zone Management Regulations 2052 (1996) came into effect and buffer zones of CNP and BNP were declared subsequently. The buffer zones for SWR and PWR has been declared recently. The buffer zone development program mainly focused community participation in biodiversity conservation and encouraging local institutions for socio-economic upliftment through various income generation activities. All these protected areas encompass rhino habitats and thus buffer zones will ultimately provide additional habitats to rhinoceros.

Around 2000 Users Groups, 53 Users Committees and 3 buffer zone development committees have been formed in CNP, BNP and SWR covering 65 Village Development Committees and over 4,00,000 populations. The Government has disbursed over 220 millions rupees (US\$ 3.2 millions) for implementing various conservation and community development activities in the buffer zones in last 6 years. Several Buffer Zone Community Forests have been handed over to local community for the protection of the forests and meeting their daily needs of forest products.

Several projects are involved in buffer zone development programs. Few to mention are:

- UNDP assisted PCP;
- WWF supported TAL Program (prior to this BICP and WETTREC);
- UNDP/GEF/SNV/WWF supported WTLBP;
- KMTNC's BCP, SCP, and TRCP implemented by BCC with support from UNDP/GEF;
- CARE Nepal supported Buffer Zone Development Program; and
- More recently UNDP/GEF/SNV/WWF supported WTLCP has started in the western part of TAL.

A mid-term evaluation of this Action Plan should be made on the basis of the regular monitoring of rhino populations and their habitats, and refined as necessary.



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Nepal's Rhino Conservation Action Plan Framework

The Rhino Conservation Action Plan consists of *in situ* conservation of the species. The rhinoceros is of particular interest for its role in the maintenance of Terai biodiversity in the country. Nepal's protected areas are not large enough especially for the conservation of mega animals that require large areas. Several other factors like poaching, illegal trade on rhino horn and habitat shrinkage has impeded the efforts of rhinoceros conservation. It is important to manage the protected areas with a comprehensive approach so that entire rhino population is conserved. Thus, this action plan should be tied up with Protected Area management plans. The specific objectives of the action plan are as follows:

OBJECTIVE 1

Continue study on rhinoceros biology and their habitat, and establish database with monitoring system

Premise

To transpire a scientific basis for rhino conservation and management a long-term research program should be initiated to assess numbers, population trend, ecological requirements, carrying capacity, and people/rhino conflicts (DNPWC, 1993). Census of rhino populations is suggested in every 5 years to assess the population status and trend. Besides, monitoring of the rhinoceros on a regular basis will be in place to support the management.

Considering the growth rate of 3.88% of rhino population in Nepal, it is apparent that the rhino population is likely to increase with the availability of the

suitable habitats and protection.

Floodplain grasslands and riverine forests in CNP contain the highest density of rhinoceros in Nepal. Floodplains in CNP and BNP are very dynamic and are dependent on the course of the rivers. Likewise, wetlands are very important for rhino to avoid heat stress and meeting nutritional requirements. Upkeep of wetlands is equally important in maintaining the flood plain grasslands for rhinoceros.

Similarly several prime rhino habitats in the protected areas are taken over by unpalatable grass species, weeds (*Pogostemon spp.*, *Eupatorium spp.*, *Lantana camera*, etc.), and tree species

such as *Bombax ceiba*, *Dalbergia sissoo*, *Acacia catechu*, etc. subsequently making them less suitable for rhino.

Several studies suggest that at present, the rhino habitat in CNP is under utilized and livestock grazing has rendered many ideal habitats literally unsuitable for rhino (Rhino Count 2000). This has led the food competition between the livestock and rhino leading to the increased crop depredation and risk of transmitting disease. Since the park is divided into different sectors, emphasis on sector-wise monitoring of rhino population and their habitat should be given for cost effectiveness and time saving.

Output

- 1.1 Updated rhino population estimate of Nepal at five years interval
 - 1.1.1 Obtained sex and age ratio of rhino
 - 1.1.2 Acquired population structure
 - 1.1.3 Recorded rhino mortality
- 1.2 Improved & defined rhino habitats
 - 1.2.1 Assessed carrying capacity of CNP, BNP and SWR
 - 1.2.2 Controlled invasive and unpalatable species of grasses, weeds and trees in rhino habitats
 - 1.2.3 Maintained wetlands and waterholes
 - 1.2.4 Regulated controlled burning
 - 1.2.5 Stopped livestock grazing in rhino habitats within the parks and reserves
 - 1.2.6 Studied impact of livestock grazing in rhino habitats
- 1.3 Prioritized research need and established database
 - 1.3.1 Produced GIS maps of rhino habitats

- 1.3.2 Identified and prioritized research needs on rhinoceros
- 1.3.3 Conducted prioritized research on rhinoceros
- 1.3.4 Documented research findings on rhinoceros
- 1.3.5 Established database at the field level
- 1.3.6 Strengthened database at the DNPWC
- 1.3.7 Published and shared research findings on rhinoceros
- 1.3.8 Established linkages with research institutions in country and abroad

Activities

- Prioritize the research need on rhinoceros
- Conduct study to assess the carrying capacity of the protected areas for rhinoceros
- Initiate GIS mapping of rhino habitats in CNP, BNP and SWR
- Conduct rhino census at five years interval
- Initiate study on rhino-elephant interface in Babai valley in BNP
- Continue study and monitoring of rhino and its habitat including grassland and riverine forest in CNP, BNP and SWR
- Initiate elimination of invasive species by uprooting weed and tree species (Eg. Icharni Tappu, Jaya Mangala Ghol, Dumaria, Kachhuwani, Shukhibar, Devital and the grasslands along the Narayani banks and Narayani islands in CNP, Babai valley (in BNP) and SWR
- Introduce planting of indigenous grass species preferred by rhino such as *Saccharum spontaneum*
- Continue regular grass cutting, burning and uprooting of woody perennials

- Improve wetlands through control on invasive aquatic vegetation
- Restore important wallowing spots (like Jaya Mangala Ghol in CNP) by improving the water supply and controlling drainage
- Develop waterholes and maintain water levels in existing waterholes in PAs, such as Devital, Tamortal, Lamital in CNP and Ranital and Solgaudital in SWR.
- Maintain/construct firelines of at least 2.5 m wide in the grassland
- Develop livestock grazing management plans for each buffer zone
- Initiate environmental monitoring of critical habitats such as flood plain grasslands in CNP, BNP and SWR
- Disseminate research findings through seminar and workshop
- Establish database at the field level
- Strengthen rhino database at the DNPWC with updated information
- Initiate developing linkages with research institutions
- Initiate studies on livestock and rhino interface



OBJECTIVE 2**Habitat expansion through rehabilitation/restoration of identified priority rhino habitats****Premise**

Rehabilitated Padampur Village Development Committee will provide a habitat suitable to rhino and that will sustain increasing population of rhino in CNP. Similarly, rehabilitated eastern sector of SWR will give more rhino habitat along Chaudhar river as well as in other vacated areas. Similarly, if Rambhori Bhata enclaves in PWR could be transformed, it will also provide an ideal habitat for rhinoceros.

Besides Padampur, there are six jungle lodges and tented camps that occupy some of the prime rhino habitats inside CNP. For the long-term conservation the impact of these facilities need to be studied and relocated elsewhere in the buffer zone if necessary. For sustainable tourism and regular inflow of money, timely attention should be taken as precautionary measures. There is an urgent need to define limits of such facilities inside the park. The tourism in the protected areas should be regulated according to the tourism plan of the respective areas.

It is important to note that rhinos inhabit forest area in the buffer zones of CNP and BNP. The Barandabhar forest with Bishajari Tal is particularly important for rhino conservation. Other potential rhino habitats should also be explored. Those forests should be protected as a rhino habitat and a wildlife corridor for linking protected areas with forests outside protected areas in the region. Similarly,

Hatarisar to Kothiyaghat across Khata Corridor and South of Babai Bridge that lies in the buffer zone of BNP are the potential rhino habitats that need to be protected. Certain manipulations will be required in order to make a habitat suitable for rhinoceros.

Output

- 2.1 Rehabilitated Rambhori Bhata in PWR
- 2.2 Protected priority potential rhino habitats in protected areas
- 2.3 Established and maintained forest corridors
- 2.4 Developed and implemented tourism plans
- 2.5 Developed and enforced tourism code of conduct
- 2.6 Conducted a detail study on the impact of Jungle lodges of CNP

Activities

- Initiate action for rehabilitation of Rambhori Bhata in PWR
- Initiate study on Old Padampur for creating a suitable rhino habitat in CNP
- Assess the carrying capacity of the CNP in terms of number of tourists, tourist amenities and facilities
- Identify and restore potential forest corridors
- Initiate studies and protect Bishajari Tal in CNP, forest from Hatarisar to Kothiyaghat across Khata Corridor and South of Babai Bridge of BNP, and Chaudhar River floodplain and Kalikich Tal in SWR
- Develop and implement tourism code of conduct in protected areas

OBJECTIVE 3**Reintroduce rhinos to create at least viable population****Premise**

The first translocation of rhinoceros from one protected area to other in Nepal was initiated in 1986 in order to create a second viable population in the country and protect the species from local extermination. So far 87 rhinoceros have been translocated from CNP to BNP in 1986, 1991, 1999, 2000, 2002 and 2003. Of these 4 were translocated to SWR in November 2000. In this joint adventurous initiatives of the DNPWC, KMTNC and WWF Nepal are providing technical and financial supports respectively.

Considering the historical range of rhino (all throughout Gangetic plain), potentiality of translocating some individuals to other protected areas should be explored. Nevertheless, considering the past experience, it is highly recommended that a detail study of the proposed site for the reintroduction be conducted prior to identifying the most suitable sites for translocation. The study should include the ecological aspect, and possible crop damage and rhino-human interface issues resulting from the translocated rhino population. Some more rhino should be added in BNP to create viable sub population of at least 100 individuals. Moreover, SWR will be the potential site for reintroduced third sub population in Nepal where 7 rhinoceros reside in the reserve now.

Output

- 3.1 Produced 5 year rhino translocation plan
- 3.2 Established at least viable rhino populations in BNP and SWR
- 3.3 Conducted studies prior to actual translocation operation
- 3.4 Continued monitoring of translocated rhinoceros
- 3.5 Produced rhino translocation operation manual (technical) in English and Nepali
- 3.6 Equipped translocation operation team with medicine, equipment, radio collar, field gears and logistics

Activities

- Develop 5-year rhino translocation plan
- Initiate study prior to translocation of rhinoceros both at the source and release site
- Purchase all necessary medicine, equipment, field gears and radio telemetry equipment
- Support logistics and additional staff for monitoring
- Produce rhino translocation manual (technical) in English and Nepali
- Produce operation report after translocation
- Continue monitoring of translocated rhinos

OBJECTIVE 4**Improve rhino-human relationship through buffer zone development and conservation education****Premise**

Local people's support will be gained only when they see the direct benefit from wildlife conservation. Majority of the local people in the buffer zone are subsistence farmers heavily depending upon the forest resources and they can not think of conservation of wildlife if their life sustaining system is disrupted. Livestock grazing is increasingly putting pressure on the rhino population for food. In addition, this has posed a threat to the health of wildlife in general with a potential risk of transmission of disease. Incidence of crop damage by rhino in the buffer zone of the park has been rising in recent years and it is primarily attributed to the agricultural farming in former rhino habitat.

Past efforts of fencing and constructing trenches in order to control crop damage have been very expensive to maintain and has become one of the major issues of park and people dissension. There is a large number of unproductive cattle that are raised because of religious beliefs and for manure. Extension programs should furnish alternatives to free ranging cattle grazing and encourage for tourism activities through buffer zone development programs.

A widespread conservation education is vital for disseminating information at all levels about the importance of rhino conservation and gaining people's support in conservation in the country. These programs have been conducted in cooperation with the buffer zone institutions, schools, media, local NGOs, INGOs and other relevant organizations.

The programs should be designed according to the target groups and its theme.

Conservation education programs through radio, TV, audio-visual, posters, papers, billboards, display and visitor center, etc. should be conducted both at local and national levels. The program should contain information on status of rhino, fines and punishments, rewards, CITES implementation and other relevant information on wildlife conservation.

Output

- 4.1 Harmonized park people relationships
- 4.2 Enhanced participation of buffer zone institutions in biodiversity conservation
- 4.3 Developed and implemented livestock grazing management plan
- 4.4 Established veterinary facilities in buffer zones
- 4.5 Developed alternative forest resource base in buffer zone for firewood and fodder
- 4.6 Involved more local people in tourism and income generation activities
- 4.7 Established community relief measures for crop depredation
- 4.8 Established relief funds to support human injury and loss of life
- 4.9 Improved information center and Audio-Visual programs
- 4.10 Produced printed publicity material on rhino conservation
- 4.11 Established Eco-clubs in schools
- 4.12 Established mobile conservation education unit
- 4.13 Organized various environmental awareness programs

Activities

- Design and organize audio-visual programs such as video, slide show, power point to suit the target audience accordingly
- Design and publish printed materials like brochure, leaflet, poster, booklets etc.
- Update information in display and visitor center
- Establish/strengthen Eco-clubs in schools
- Organize interaction programs with media, local bodies, buffer zone institutions, local NGOs and other concerned organizations
- Participate in different environmental programs organized locally, nationally and internationally
- Perform different contests and reward the winners and contestants
- Publicize information through department's conservation bulletin and local newspapers
- Establish mobile conservation unit at the department
- Establish mini rhino museum in CNP, BNP and SWR
- Initiate various community development programs (income generation and alternative resource development)
- Incorporate veterinary facilities in extension package to encourage local farmers to rear improved livestock breed and stall feedings
- Develop extension program to discourage farmers from raising unproductive livestock
- Promote alternative energy source like biogas and energy saving.
- Organize training in hotel/lodge management, tour operators, and nature guides
- Encourage silvi-pastoral plantation in the community land in the buffer zone
- Induce rotational livestock grazing in communal grazing lands in buffer zone
- Initiate developing community compensation mechanism for crop depredation
- Initiate/strengthen relief funds to support human injury and casualty
- Strengthen buffer zone institutions through training and technical support



OBJECTIVE 5**Strengthen anti-poaching capability****Premise**

In the beginning of the park establishment, in addition to the armed Rhino Patrol Guards, APUs were established in cooperation with Flora and Fauna Preservation Society to curb the escalating rhino poaching. The escalation in poaching is attributed to the highly priced rhino horns in the Southeast Asian markets.

Considering the ascending poaching activity, APUs were constituted once again with the support of WWF Nepal and ITNC. The strategy of the program is to work in close collaboration with local people who work as secret informants to the park management in order to prevent poaching and apprehend poachers. Efficiency of these units is limited due to inadequacy of equipment such as vehicles, portable communication equipment, and necessary firearms. The rhino poaching shall to be controlled by strengthening the Anti Poaching capability by assigning adequate staff, fund, equipment, and providing training. There is a need to institutionalize APUs for providing legal base and its sustainability.

The park provides awards to the informants up to the amount of Rs. 50,000 (US\$ 700). The penalty for poaching rhino varies from 5 to 15 years of imprisonment with a fine of Rs. 50,000 to Rs. 1,00,000 (US\$ 700 to US\$ 1,400) or both depending upon the magnitude of the offence committed. Despite severe penalties and hard efforts for constant surveillance occasional poaching is still

reported. So cooperation of local peoples living in the buffer zone and adjacent to the protected areas is the key to achieving success in combating against poaching. However, cooperation from the local people can be expected only when they see some direct benefit to them from the protection of wildlife species. The amendment of National Parks and Wildlife Conservation Act (1973, Amend 1993) empowers to declare buffer zone and channel 30 to 50% of the Park revenue in the local community development. This program will certainly help develop some positive attitudes among local community toward biodiversity conservation and increase community surveillance in protecting endangered wildlife.

It is also necessary to impose stringent trade restrictions and surveillance at the major custom posts in Nepal. The CITES Implementation Workshops similar to the one held in Kathmandu in 1995 should be held frequently to make various agencies such as Police, Custom, Forest, Public Administration, Journalists, etc. understand about CITES and share information. It is also needed to have a bilateral agreement through transboundary meeting with neighboring counterparts to curb poaching activities and the illegal trade of endangered wildlife. A bill for national legislation on CITES implementation has been drafted and submitted to the Government in the process of getting approval from the parliament. A joint effort of all concerned parties is required for successful implementation of CITES in Nepal.

Output

- 5.1 Enacted a separate CITES legislation in Nepal
- 5.2 Institutionalized anti-poaching units
- 5.3 Strengthened anti-poaching capabilities in all protected areas
- 5.4 Organized workshops, coordination meetings and training to all concerned agencies
- 5.5 Publicized the importance of wildlife conservation
- 5.6 Prepared disposal plan for rhino horn stock piles

Activities

- Expedite the approval process of CITES bill
- Initiate process for institutionalizing anti-poaching units and reward system
- Identify possibilities for financially sustaining the anti-poaching initiatives
- Equip anti-poaching units with all necessary field gears and equipment
- Organize workshops and coordination meetings at local, national and transboundary levels
- Organize training to all concerned agencies at different levels
- Widespread the conservation education and out-reach program
- Prepare annual progress report of anti-poaching efforts
- Review the current anti-poaching efforts
- Develop infrastructure and buildings
- Prepare disposal plan for rhino horn stock piles.



OBJECTIVE 6**Build institutional capacity****Premise**

To increase the efficiency of park personnel in rhino conservation; specific training such as habitat improvement, population monitoring, anti-poaching, conservation education and extension, orphan rearing, etc. should be provided on the regular basis for enhancing skill and capability of the park staff. The institutional supports need to be provided to the department as well as to the parks including Hatisar in enhancing their capacity in the management of protected areas. Hatisar and elephants are vital for conducting research on wildlife species particularly large mammals and carrying out rhino translocation successfully. Similarly newly formed buffer zone institutions should be supported for their capacity building through training.

It has been noticed that every year the park has been rearing one or two rescued orphan rhino calves from the wild. Such calves are either abandoned by the mother or injured by some predators. As population of rhinoceros is growing, the incidents of rhino injuries from fighting or by other causes will be increasing in the days to come. Therefore, there is a need to establish an orphanage/or treatment center in each Terai protected area where possible.

The stockpiles of rhino horns collected from natural death of animals or seized from the poachers or traders have increased both in Park Headquarters in Kasara, CNP and Tikauli, a training center under the District Forest Office, Chitwan. There is a problem of storing those rhino

horns properly and concerned authorities are worried about the security of the stockpiles. There is no set mechanism for disposal of such valuable horns. There is a chance of limited use of those horns as an educational material by displaying them in museums. An appropriate mechanism should be developed for wise use of rhino horns in future.

Output

- 6.1 Assessed training needs of the department and buffer zone institutions
- 6.2 Provided training on regular basis to staff at all levels
- 6.3 Established orphanage center in each protected area
- 6.4 Improved storing of rhino horn stockpiles
- 6.5 Developed mechanism for wise use of rhino horns as an educational material
- 6.6 Strengthened Hatisar management for rhino research and monitoring

Activities

- Assess training needs of the department
- Appraise training needs of buffer zone institutions or community based organizations
- Provide training on regular basis to staff as per identified needs
- Maintain/develop infrastructure & buildings of Hatisar
- Provide materials (rope, tripol, daddi, khurji etc.) on regular basis
- Regularize training of baby elephants in the breeding center

- Furnish training to buffer zone communities as per identified needs
- Initiate study on the feasibility of establishing rhino orphanage center in each protected area
- Establish orphanage center as per the report
- Review the present storing system of stockpiles
- Improve storing of rhino horn stockpiles as per the recommendations
- Develop mechanism for wise use of rhino horns as an educational material
- Provide training on tanning and preserving stockpiles

OBJECTIVE 7

Limit transfer of rhinos for *ex-situ* conservation from wild populations

Premise

Rhinoceros has always been in high demand from zoos and research stations of several countries. A number of rhinos had been provided to various organizations in the past but later it became a matter of concern for lacking transparency of the deal. Nepal has presented more than 24 rhinos to the people and the government of several countries as a token of cordial friendship between the countries. Prior to Count Rhino 1994 and Rhino Count 2000, no accurate information on rhino population in CNP was available and hence it was difficult to accept any request for rhinos from such organizations. The Rhino Count 2000 reveals that the rhino population is increasing both in CNP and BNP. So providing few rhinos to international organizations strictly for research purpose is unlikely to have adverse impact on the

source population. Funding received from such exchange should be strictly used to the rhino conservation initiatives as per the Rhino Action Plan maintaining the transparency of the deal.

Output

- 7.1 Developed criteria for transfer of rhinos from wild population for *ex-situ* conservation
- 7.2 Established mechanism for mobilization of Rhino Conservation Trust Funds made available from the transfer

Activities

- Initiate developing criteria for transfer of rhinos for *ex-situ* conservation
- Initiate developing mechanism for mobilizing funds made available from the transfer
- Set translocation operation schedules

OBJECTIVE 8**Strengthen national, transboundary, regional and international collaboration****Premise**

The successful revival of rhinoceros in Nepal shows the firm commitment of the government in biodiversity conservation and the effective implementation of the programs. Several conservation partners from local level to national, regional and international levels have been involved constantly to accomplish this exemplary initiative in conservation in the country. However, protected area management is not just a species management; it has become a holistic and multi-dimensional approach covering wildlife as well as human dimension. So there is a need to establish close cooperation among the line agencies, organizations, local bodies and research institutions for long-term conservation of rhinoceros or wildlife in totality. DoF is responsible for managing forest outside protected areas where rhinoceros shares its habitat, so close cooperation with such institution is essential for conserving wildlife and their habitats. Similarly, there are several other organizations whose support is necessary for controlling poaching and illegal trade on wildlife and their products.

Unlimited demands for rhino horns in international market persistently posing great threat to the very survival of rhinoceros in the wild. So Nepal is promoting transboundary cooperation with her neighboring countries India and China for the protection of wild animals on either side of the country and controlling illegal trade on wildlife and their body parts.

Similarly, a regional and international collaboration will be always necessary for effective conservation of rhinoceros in the range states. Nepal is a signatory to

international conventions such as CITES, CBD, World Heritage, Ramsar, and GTF. Nepal had series of coordination meetings with the counterparts in India and China both at central and field levels. Such meetings have become supplementary in wildlife conservation and controlling illegal trades on wildlife and their body parts.

Output

- 8.1 Enhanced transboundary cooperation with neighboring countries
- 8.2 Shared information on protected area management and illegal trade on wildlife
- 8.3 Increased international supports in wildlife conservation
- 8.4 Established a network of coordination and cooperation among concerned parties
- 8.5 Shared information on conservation efforts

Activities

- Formalize transboundary cooperation initiatives
- Organize transboundary cooperation meetings with the neighboring countries
- Conduct exchange visits or meetings at field level
- Initiate conservation programs complementary to each other
- Share relevant information on conservation and illegal trade on wildlife
- Publicize Nepal's successful efforts in wildlife conservation
- Establish a network with concerned parties for coordination and cooperation
- Disseminate information on conservation initiatives
- Organize periodic coordination meetings with concerned parties
- Conduct periodic interaction program on conservation efforts

OBJECTIVE 9**Ensure sustainable funding to implement rhino conservation action plan****Premise**

Nepal is one of the least developed countries and has set aside over 19.42% of its total land to protected area systems. Since conservation requires continuous efforts and large sum of funds for meeting the challenges in maintaining the protected area systems at par to the international standard, some sustainable sources of funding should be developed for meeting the incremental cost in implementing the rhino action plan. An estimate of US\$ 2.9 millions will be required for implementing rhino action plan over the 5 years period. There is a need to develop proposals to implement various programs as specified in the action plan and solicit it to the different potential conservation partners.

Output

- 9.1 Ensured sustainable funding for wildlife conservation
- 9.2 Developed proposals for funding to implement the recommended programs by the rhino action plan
- 9.3 Implemented programs as per the rhino action plan

Activities

- Develop proposals and solicit to the potential conservation partners for funding
- Organize workshops/meetings with conservation partners
- Organize field visits to the conservation partners to show the accomplishments
- Solicit supports from international organizations



Five years Action Plan Program (Activities and Indicative Budget)

The total budget to implement five years action plan is estimated at US\$ 2.90 millions. Of this US\$ 1.47 millions has been set-aside for CNP, US\$ 0.833 millions for BNP and US\$ 0.587 millions for SWR. The major portion (30%) of the total budget is for up keeping the anti-poaching operations.

Chitwan National Park

Activities	No/Unit	Year I	Year II	Year III	Year IV	Year V	Indicative Budget \$
Preparation of rhino translocation Plan	1						10,000
Translocation	15 animals						30,000
Preparation of translocation manual	1						10,000
Census	1						30,000
Anti-poaching	10 teams						5,00,000
Additional guard posts	3						24,000
Population study							50,000
Habitat study							50,000
Habitat improvement	500 ha						70,000
Rhino orphanage/orphan care taking							50,000
Regular monitoring							1,00,000
Waterhole construction/maintenance	3						15,000
Storage of stock piles							50,000
Medication of wounded animals							15,000
Database establishment/update							25,000
Livestock grazing control							45,000
Hatisar management	2						1,00,000
Development tourism code of conduct	1						25,000
Conservation education/materials							40,000
Logistics/equipment/drugs							25,000
Training/workshop/seminar	3						40,000
Relief funds	1						1,00,000
Other unseen costs							1,00,000
Sub-total							14,79,000

Bardia National Park

Activities	No/Unit	Year I	Year II	Year III	Year IV	Year V	Indicative Budget \$
Census	1						20,000
Anti-poaching	6 teams						2,00,000
Additional guard posts	6						48,000
Population study							45,000
Habitat study							40,000
Habitat improvement	500 ha						70,000
Rhino orphanage/orphan care taking							30,000
Regular monitoring							75,000
Waterhole construction/maintenance	3						10,000
Storage of stock piles							15,000
Medication of wounded animals							10,000
Database establishment/update							15,000
Livestock grazing control							25,000
Hatisar management							25,000
Development tourism code of conduct	1						25,000
Conservation education/materials							25,000
Logistics/equipment/drugs							25,000
Training/workshop/seminar	3						30,000
Relief funds	1						50,000
Other unseen costs							50,000
Sub-total							8,33,000

Suklaphanta Wildlife Reserve

Activities	No/Unit	Year I	Year II	Year III	Year IV	Year V	Indicative Budget \$
Census	1						15,000
Anti-poaching	4 teams						2,00,000
Additional guard posts	4						32,000
Population study							10,000
Habitat study							10,000
Habitat improvement	200 ha						40,000
Rhino orphanage/care taking	1						10,000
Regular monitoring							50,000
Waterhole construction/maintenance	3						10,000
Storage of stock piles							5,000
Medication of wounded animals							5,000
Database establishment/update							15,000
Livestock grazing control							25,000
Hatisar management							25,000
Development tourism code of conduct	1						25,000
Conservation education/materials							15,000
Logistics/equipment/drugs							15,000
Training/workshop/seminar	3						25,000
Relief funds	1						30,000
Other unseen costs							25,000
Sub-total							5,87,000



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Appendix-1

Natural History of Rhino

The Greater One-horned Rhinoceros (*Rhinoceros unicornis*) once commonly wandered throughout the northern floodplain and nearby foothills of the Indian sub-continent between Indo-Myanmar border in the east and Sindhu River basin, Pakistan in the west. The species now exist in some small population units situated in northern India and Nepal. The rhinoceros prefer to inhabit the alluvial floodplain vegetation of sub-tropical climate where water and green grasses are available all year round. They live on a diet of floodplain grasses, tree saplings, shrubs, aquatic plants, herbs and fruits. Annual monsoon floods altered the spatial distribution of these successional grasslands but maintained prime grazing habitat and high rhinoceros densities. The study has revealed that a rhinoceros eats the fruits and seeds of at least 30 species of plants (Dinerstein and Price 1991).

Populations of rhinoceros have decreased drastically over the last 400 years as a result of land clearing and poaching (Blanford 1988). Once abundant, rhinoceros are now battling for their survival due to heavy poaching and destruction of suitable habitats. This species is less threatened than the other Asian species. With the increase in the use of modern firearms, the farfetched value attached to rhinoceros horn, and

the superstitious beliefs put on the magical power of the blood, urine and other parts have exerted tremendous pressure on the survival of this species.

Rhinoceros populations have increased and rhinos have been successfully translocated to re-establish populations in areas where the species had been exterminated in Nepal. The total estimated number of Greater One-horned Rhinoceros in wild is about 2,000 individuals and about 135 individuals in captivity in the world.

All the living rhinoceroses are included in a single family. The rhinoceros may exceed 2,000 kg in weight and have massive build because of their thick and solid bones. The skin is either thinly clad with hair or naked and the heavy hide in places is thrown into deep folds. The skin of rhinoceros is divided into great shields by heavy folds before and behind the shoulders and in front of the thighs. The fold in front of the shoulders is not continued right across the back, a distinctive character of this rhinoceros. On the flanks, shoulders, and hindquarters, the skin is studded with masses of rounded tubercles. With its grotesque build, long boat-shaped head, its folds of armor, and its tuberculated hide.

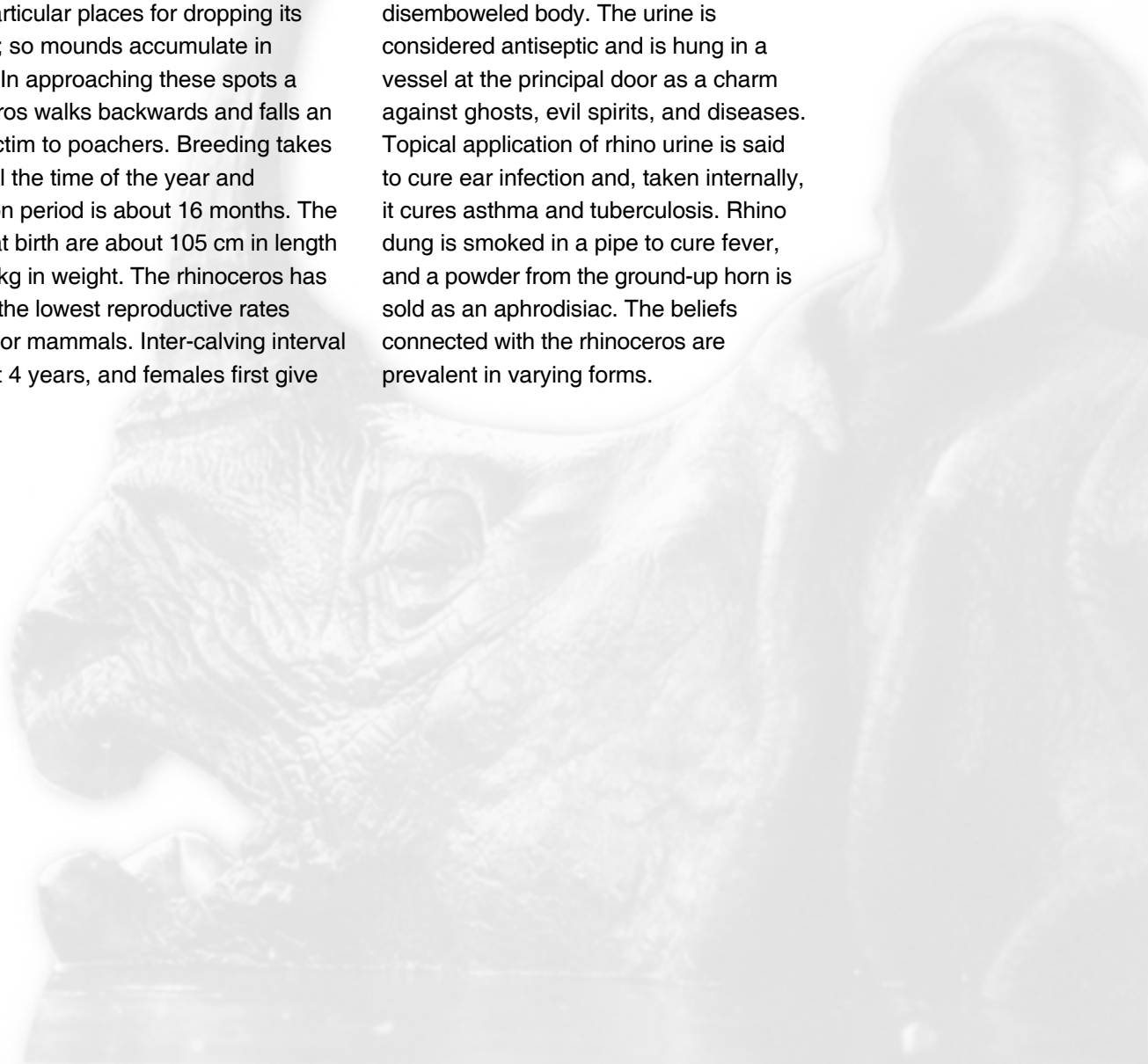
The nasal bones are extended to serve as support for a single horn and the horn is formed of a closely matted mass of horny fiber emerging from the skin. The horn has no connection with skull, although a boss of bone in the skull may serve as its foundation and grows throughout life and if lost are reproduced. Greater One-horned Rhinoceros is one of the largest of all existing rhinoceroses. A male may reach over 180 cm at the shoulder with a girth of 335 cm behind the withers. It is smaller than the African White rhinoceros but larger than the African Black rhinoceros.

The rhinoceros is solitary though several may occupy the same patch of forest. In Nepal, during the monsoon, they frequently enter into farmlands. They have particular places for dropping its excreta; so mounds accumulate in places. In approaching these spots a rhinoceros walks backwards and falls an easy victim to poachers. Breeding takes place all the time of the year and gestation period is about 16 months. The young at birth are about 105 cm in length and 60 kg in weight. The rhinoceros has among the lowest reproductive rates known for mammals. Inter-calving interval is about 4 years, and females first give

birth as early as about 6.5 years.

Females nurse babies to the age of 2 years, but by the age of 2 months the calves begin supplementing milk intake with grass shoots, and by 10 months they graze and browse freely. The rhino cows guard young calves intimately; calves become separated from their mothers when cows are chased by breeding bulls and occasionally during long grazing bouts (Laurie 1982).

Many legends and beliefs are attached to this animal and its horn was generally believed to have peculiar medical virtues. In Nepal, the flesh and the blood of the rhinoceros is considered highly acceptable to the manes. High caste Hindus used to offer libation of the animal's blood after entering its disemboweled body. The urine is considered antiseptic and is hung in a vessel at the principal door as a charm against ghosts, evil spirits, and diseases. Topical application of rhino urine is said to cure ear infection and, taken internally, it cures asthma and tuberculosis. Rhino dung is smoked in a pipe to cure fever, and a powder from the ground-up horn is sold as an aphrodisiac. The beliefs connected with the rhinoceros are prevalent in varying forms.





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