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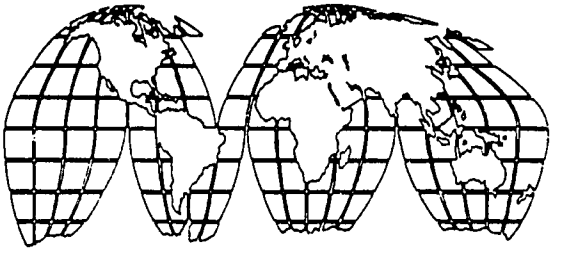

Protecting Biological Diversity: *Nepal Case Study*

March 1994

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Protecting Biological Diversity: *Nepal Case Study*

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by

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Agency for International Development
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This Working Paper is one of a number of case studies prepared for CDIE's assessment of USAID Protecting Biological Diversity programs. As an interim report, it provides the data from which the assessment synthesis is drawn. Working Papers are not formally published and distributed, but interested readers can obtain a copy from the DISC.

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FOREWORD

USAID's Center for Development Information and Evaluation (CDIE) is currently conducting a series of assessments of the Agency's environmental and natural resource management programs. This case study contributes to an assessment biological diversity protection programs.

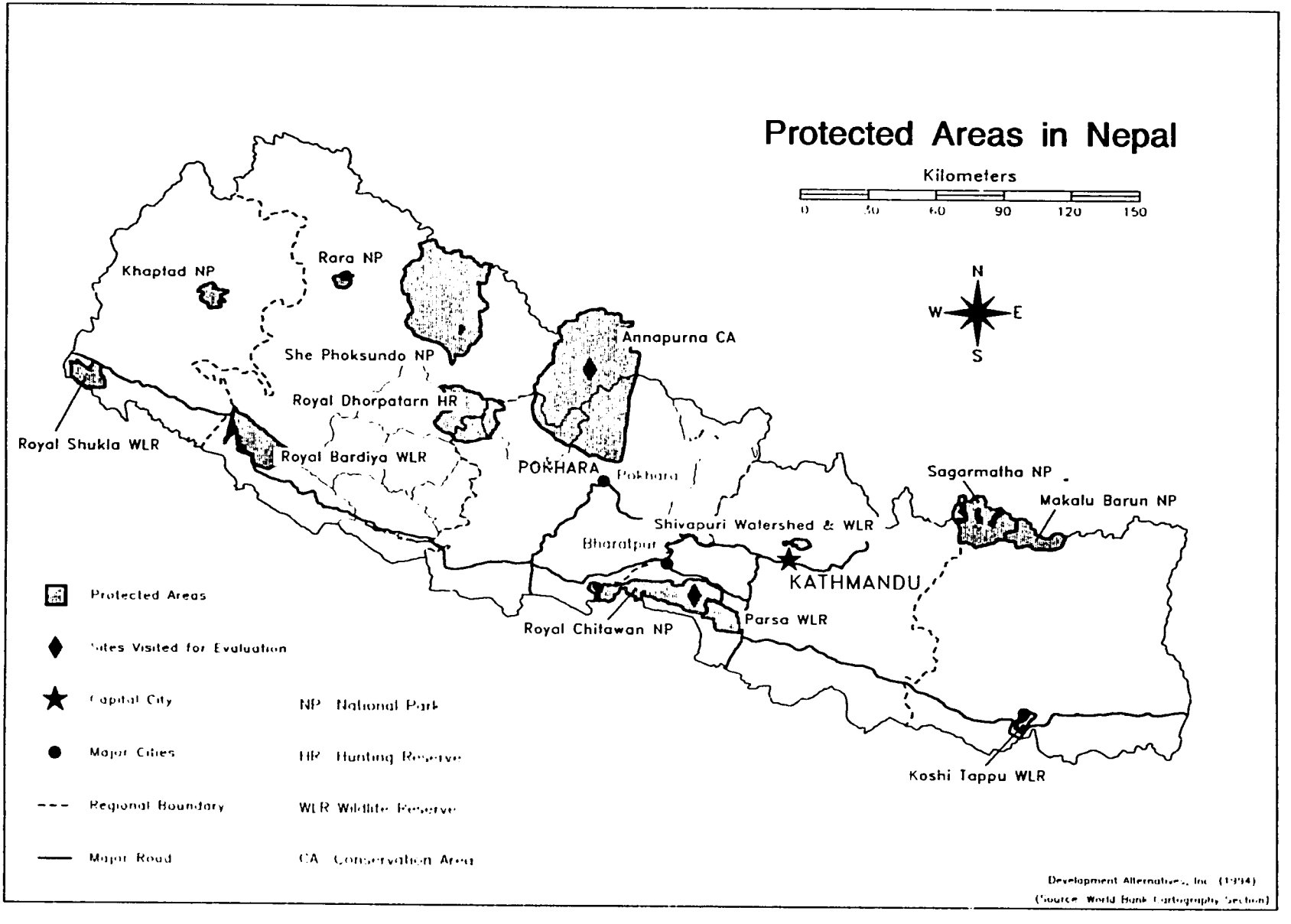
This December, 1993 field study, which examines the conservation of biological resources in the Royal Chitwan National Park in Nepal, is one of six country case studies. Chitwan's resources which include the Greater Asian rhinoceros and the Bengal tiger are sufficiently unique to merit classification as a World Heritage Site, one of only about 100 sites so-designated globally for their exceptional natural value. Moreover, the park was the first in Nepal's park and protected area system which now covers over 10 percent of the country. Because of foresightful and convincing efforts early in the park's history, the habitat and its fauna persist even as the surrounding landscape is transformed by agricultural and commercial development.

Similar studies have been completed in the Sri Lanka, Thailand and Madagascar, with work in Latin America ongoing. The results of the six case studies, all of which follow a similar analytic framework, will be synthesized into an overall assessment that summarizes lessons learned from a global perspective and highlights for USAID management the program implications of those lessons.

The team wishes to thank all those individuals who gave so generously of their time during the assessment. We feel privileged to have had the opportunity to meet with such knowledgeable and dedicated people. We hope that our efforts, in however small a way, assist them in ensuring that Nepal's treasures are shared for many generations to come.

GLOSSARY

ACAP	Annapurna Conservation Area Project
BSP	USAID Biodiversity Support Program
CDIE	Center for Development Information and Evaluation
DNPWC	Department of National Parks and Wildlife Conservation
ECCA	Environmental Camps for Conservation Awareness
GON	Government of Nepal
HMG	His Majesty's Government
IOF	Institute of Forestry
IUCN	World Conservation Union (formerly International Union for the Conservation of Nature and Natural Resources)
KEEP	Kathmandu Environmental Education Project
KMTNC	King Mahendra Trust for Nature Conservation
NCRTC	Nepal Conservation Research and Training Center (formerly NECTARI)
NCS	National Conservation Strategy
NECTARI	Nepal Environmental Conservation Training and Research Institute
NEPAP	Nepal Environmental Policy and Action Plan
NGO	Non-Governmental Organization
NPWCA	National Parks and Wildlife Conservation Act
RCNP	Royal Chitwan National Park
RCUP	Resource Conservation and Utilization Project
UNEP	United Nations Environment Program
USAID	U.S. Agency for International Development
WCS	World Conservation Strategy
WMI	Woodlands Mountain Institute


Protected Areas in Nepal
Kilometers
0
30
60
90
120
150
N
W
E
S
Khaptad NP
Rara NP
She Phoksundo NP
Royal Dhorpatarn HR
Annapurna CA
Royal Shukla WLR
Royal Bardiya WLR
POKHARA
Pokhara
Sagarmatha NP
Makalu Barun NP
Shivapuri Watershed & WLR
Bharatpur
KATHMANDU
Parsa WLR
Royal Chitawan NP
Koshi Tappu WLR
Protected Areas
Sites Visited for Evaluation
Capital City
Major Cities
Regional Boundary
Major Road
NP National Park
HR Hunting Reserve
WLR Wildlife Reserve
CA Conservation Area
Development Alternatives, Inc. (1994)
(Source: World Bank Cartography Section)

1. INTRODUCTION

Overview

This report offers an example of an emerging approach to addressing the conflict between the need to protect the biological diversity of an area and a local people's escalating need to exploit that area for wood, game, fodder, agricultural land and other purposes. While the focus is upon Royal Chitwan National Park (RCNP) in Nepal, similar conflicts are occurring elsewhere in the country and throughout the world. In fact, the park versus people theme has become predominant in the debate over the management of protected areas in developing countries (Nepal and Weber 1993, Wells 1992).

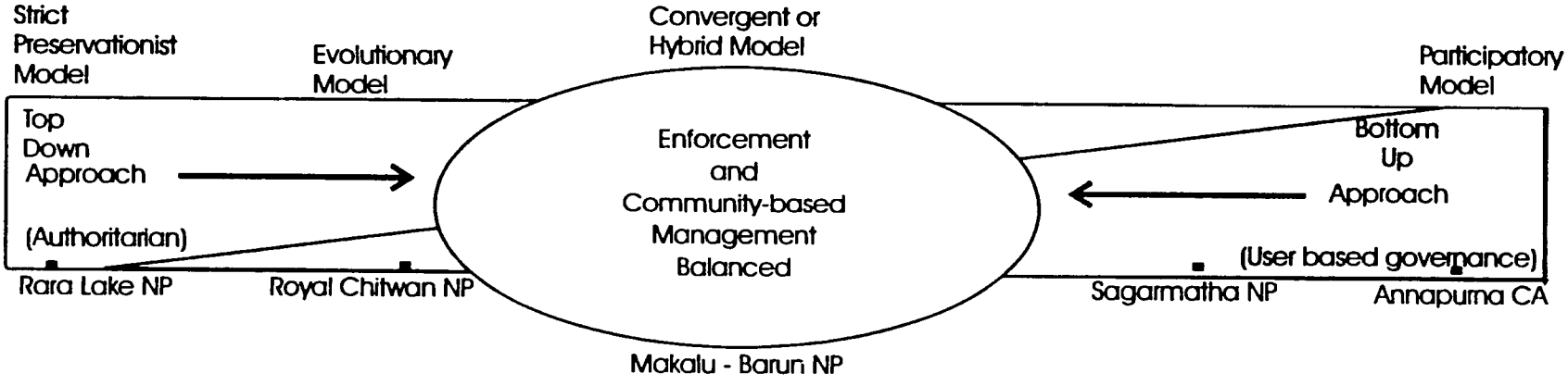
The conventional approach to protecting biologically rich areas derives from the western model of enforced protection. Under this model, the collection of wood, hunting of game, grazing of livestock, and other consumptive uses of the park are strictly prohibited. In some cases, as in Nepal, established communities have been forcibly relocated outside a park's boundary, and an armed military force has been charged with enforcing legal prohibitions against incursions into the park. A newer approach to conserving protected areas encourages more sustainable park protection by vesting certain use rights and management responsibilities with local communities.

The challenge facing park management is to find the appropriate balance between an authoritarian model of enforced protection and a community-based participatory approach that responds to local needs without sacrificing essential conservation objectives (See Figure 1). Depending on the initial situation and the nature and magnitude of the threats to the resources of a given park, what constitutes an appropriate balance and how to achieve it will certainly vary. Because it includes examples falling at both extremes of this continuum in a situation of dynamic change, Nepal offered a rich context in which to examine differing strategies for preserving forest habitat and the diverse biological resources they contain.

Nepal's exceptional landscapes, ecosystems, fauna and flora almost need no introduction. The country's protected areas include two world heritage sites which recognize the environmental value of, on the one hand, the world's highest mountains with their unique alpine ecology and, on the other, of some of the largest tracts of South Asia's humid forest, habitat for, among other species, the Bengal tiger, the endangered Asian one-horned rhinoceros, and the rare gharial and muggar crocodiles. The intrinsic value of this natural heritage, by virtue of the tourism it attracts, reverberates throughout the national economy.

Figure 1

A Continuum of Park Management Models in Nepal



RCNP management is of particular interest because, as a model of park management, it represents an intermediate but transitional point along the continuum between the extremes of protection and participation. It provided an opportunity to evaluate whether it was possible to move in an evolutionary manner from away from strict protection toward a "convergent" or "hybrid model" of park management where enforcement and participation are appropriately balanced. Through practical experimentation, new participatory activities supporting Chitwan's forest habitats are added to the established program of exclusionary preservation. Under this model the need for repressive control measures can be expected to decline. Figure 1 situates Chitwan in the context of this ongoing process. CDIE's findings address the impact of the progress to date in its application.

Organization of Report

This report responds to an overall design for CDIE's biodiversity assessment and is divided into seven general sections. The present introduction is followed by section two which defines the development problem and summarizes USAID's approach to solving it. Sections 3, 4, and 5 the evaluation findings sections, focus on the implementation of the USAID supported conservation and development activities associated with Chitwan, their impact and their performance. Findings are linked to observed indicators of biophysical and socio-economic change which help to frame the more difficult question of long term impact -- that is, has biological diversity been conserved? The sixth section highlights the lessons learned from USAID's experience in this area. A final section is devoted to outstanding issues, or major problems that have yet to be resolved. Several appendixes and a bibliography supplement and expand upon the material contained in the main body of the report. Appendix D is especially pertinent to the assessment's conclusion. It explores recent policy changes that pave the way for greater involvement of local populations in protected areas and surrounding buffer zone management.

2. BACKGROUND

The Problem

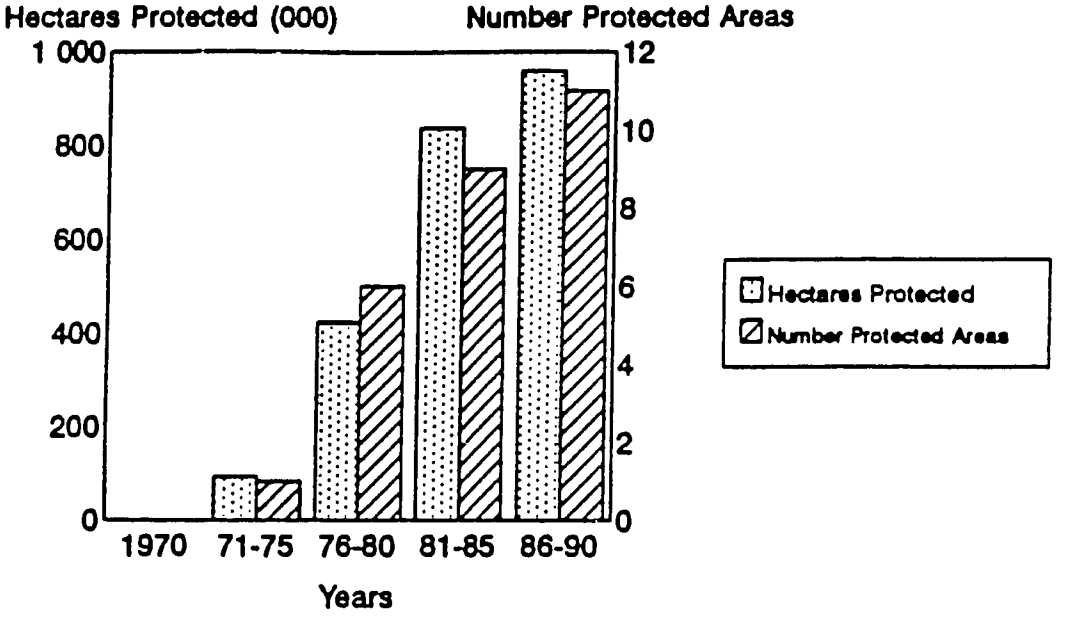
The establishment and management of national parks is one of the most important ways of ensuring that natural areas encompassing critical forest habitats can be preserved intact and freed from excessive disturbance. During the 1970s, many national parks and wildlife sanctuaries were established in both developed and developing countries. By the early 1980s there were more than 2,600 protected areas in the world covering nearly four million square kilometers in 124 countries. Currently, more than 8,000 natural areas, encompassing about 8.5 million square kilometers, meet the internationally recognized criteria as national parks and protected areas.

Recently, Nepal has made significant headway in bringing critical areas of the country under protection. Since the establishment of RCNP in 1973, there has been a rapid expansion to 14 protected areas amounting to 1,664,300 hectares (See Figure 2). In the 1980s alone, the amount of land in protected areas increased by 126 percent and now encompasses about 12 percent of the country. These biologically rich areas in Nepal are, however, under increasing pressure from local communities for forest resources, including wood and fodder, as well as for land for cultivation and grazing. Royal Chitwan National Park in particular has been beset by a growing human population along its borders.

People-park conflicts are as old as parks themselves, but they have been brought into public view over the past two decades by the rapidly growing concern for the global environment. Such conflicts are rooted within the widely accepted concept of a "protected area" which largely ignores the interests of surrounding communities. Because local needs and their attendant pressures are undeniable, this shortcoming has led to a reassessment of park management strategies. Park authorities are forced to determine what level of usage is compatible with the park's conservation mission.

Solutions to the conflicts lie not only in new programs such as those supported by USAID, but in the often more subtle changes in the way managers view policies and manage existing programs. In Chitwan, as elsewhere, the traditional model of protection has been rethought in favor of a gradually emerging approach that integrates the needs of the people surrounding the park with the need to protect park resources as a national heritage. Although focused on such programs and changes of policy that have affected the management of Royal Chitwan National Park, we include comparative analysis situating Chitwan relative to the larger national protected areas program.

Figure 2: Nepal's Protected Areas
1970-1990



(Protected areas include IUCN categories I-V)

Changes away from a strict preservationist model have been incremental and not the subject of single focussed intervention. Rather, they reflect an attempt to apply evolving concepts of park management to a real world context. Neither USAID, as discussed below, nor any other single donor has taken center stage in this process. Despite difficulties in determining attribution, the Agency's ongoing but intermittent involvement with the RCNP model, makes it a particularly pertinent case for the CDIE study.

Nepal Protected Areas Program and Chitwan

In 1958, it was estimated that only about 35 rhinos remained in RCNP, most having fallen to poachers. With Nepal verging on losing one of its most renowned biological treasures (*Rhinoceros unicorns* had been proclaimed a "royal animal" by Jung Bahadur in 1846), among the first steps taken was to protected the rhinos' habitat. H.M. King Mahendra gave instructions in 1964 to give sanctuary status to this area as well as the area south of the Rapti River which is the main habitat of the rhinoceros. As the accompanying text box indicates rhinos are not the only important species for which the park provides critical habitat (See Box 1). Thousands of park dwellers were relocated outside the boundaries. But the rhino population was still far from secure. The successful eradication of malaria in the Terai in the late 1950s led to an active program of colonization and resettlement in the region.

********** **Box 1** **********

ROYAL CHITWAN NATIONAL PARK AND PARSA WILDLIFE RESERVE

Royal Chitwan National Park and the contiguous Parsa Wildlife Reserve form the heart of one the world's largest remaining tracts of Indus-Ganges Monsoon Forest. With its unique resources, UNESCO approved Chitwan as a World Heritage Site in 1984. Chitwan lies in the lowlands or Inner Terai of southern central Nepal on the international border with India. The park was enlarged from 54,400 hectare to its present size of 93,200 hectare in 1977. Parsa Wildlife Reserve covers 49,900 hectare. Conditions are subtropical with a summer monsoon from mid--June to late-September, and a relatively dry winter. Mean annual rainfall is 2400 mm with about 90% falling in the monsoon from June to September.

In the 1950s, with the fall of the Rana regime and the eradication of malaria from the area, the human population of Chitwan rose from 36,000 to 261,300 people by the late 1980s. As one of the most popular tourist destinations outside Kathmandu and Pokhara, visitor numbers have risen from less than 1,000 in 1974 to almost 60,000 at present. The increased human presence threatens important biological resources. Extensive deforestation resulted in the rapid decline of the wildlife populations. The Asian one-horned rhinoceros population dwindled from 1,000 in 1951 to 90 in 1969- or by over 90 percent. The population of tigers was reduced to 25. Wildlife species such as water buffaloes and swamp deer became extinct (Nepal and Webber 1993).

Chitwan National Park and the adjacent Parsa Wildlife Reserve constitute the largest and least disturbed example of sal forest and associated communities of the Terai. Species diversity is high. Chitwan supports the world's second largest population of Indian rhinoceros and is also an important refuge for tiger and gharial. Over 40 species of mammals have been recorded. Tiger Panthera tigris classified by IUCN as endangered is present and has been the subject of a long-term study begun in 1974. The population increased from an estimated 25 in 1974 to 70-110 in 1980, of which 24-30 are resident breeders at any one time, but has recently

crashed. Half of the resident tigers in the western portion of the park disappeared during the 1990 monsoon and two-thirds of dependent young were also missing. Other threatened mammal species include wild dog Cuon alpinus, sloth bear Melursus ursinus, Ganges river dolphin Platanista gangetica, and gaur Bos gaurus. The river dolphin population may have declined following the construction of a dam towards the Indian border. Seven were recorded in 1980 but none in 1990. Its tall grasslands and riverain forest support a very high wild ungulate biomass which greatly exceeds that reported elsewhere in the Indian subcontinent. Four-horned antelope Tetracerus quadricornis occurs in Parsa, on the southern slopes of the Churia Hills, and the reserve contains Nepal's only reproducing herd of about 21 elephants.

A larger number of bird species has been recorded in Chitwan (489 total) than in any other protected area in Nepal. This is because of the park's wide range of habitats and location within the tropical lowlands of Central Nepal where eastern and western species overlap in their range. Chitwan is very important for winter birds (about 160 in total), both winter visitors from outside Nepal and many altitudinal migrants which descend to the lowlands outside the breeding season, as well as a valuable staging point for numerous passage migrant species.

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These developments led to the passage, in March 1973, of the National Parks and Wildlife Conservation Act which provided basic laws for the creation and management of national parks and protected areas. Under the provision of the Act, the Royal Chitwan National Park established that same year, became the first national park in Nepal. The new park service attempted to assert a policy of strict protection, but with the surrounding population growing at some 6 percent a year, the park and its resources have been inadequately preserved. In 1977, additions expanded RCNP to its present 932 square kilometers.

The 1974 RCNP Regulations reflected management's ambivalence toward local perception or acceptance of the protected area and made no provision for local involvement in its conservation. The dominant park management paradigm at that time stressed segregation of a protected area from its surroundings. However, villagers around the park depend on field cropping for their livelihood and upon the forest for many of their necessities such as thatch, timber, firewood, leafy fodder and supplementary grazing by their livestock.

Initial efforts were made to stop the resource exploitation within RCNP by the local people. The imposition of park regulations on local use resulted in many conflicts between villagers and the park authorities. The ensuing resentment and acrimonious feeling between park staff and local people over resource abuse prompted government recognition that imposing a policy of total exclusion did not further the park's conservation objectives.

According to the initial (1975-1979) management plan for RCNP, the objective of the park was to ensure effective conservation and management of the country's valuable but diminishing wildlife and their habitats by establishing the park and associated reserves. Terai forests, in addition to their conservation role, contribute

to the development of Nepal's economically important forest industry and are thus under relentless pressure of public and private logging interests. With the establishment of the national park, growing populations, and shrinking forests outside the park, local people could no longer use these resources to the extent needed (See Box 2). A compromise was needed.

********** - BOX 2 - **********

THE PEOPLE OF THE PEOPLE-PARKS DILEMMA

Even before the eradication of malaria and other diseases, the Chitwan area was inhabited by the indigenous Tharus who carved from the forest small settlements where they practiced rice farming and cattle raising supplemented by hunting fishing and gathering from the nearby forest. During the 1950s and 1960s, as colonists from the Middle Hills descended into the Terai, the Tharu were increasingly displaced by the new residents who better understood the intricacies of land registration and modern tenure systems. More recently, they have become wiser to the threats to their tenure and are better able to hold on to their land. The persistent house forms, festivals and dance characteristic of the Tharu culture persist and have reinvigorated the indigenous economy as foreign tourists have been attracted in particular to the Tharu martial art of "stick dancing." The Tharu have a refined knowledge of local plants and animals and traditionally use forest products to meet many dietary and medicinal needs.

By far the largest percentage of the local population consists of migrants arriving in the area over the past twenty to thirty years from Nepal's Middle Hills and from Northern India. Land in most areas around the park periphery has become scarce, and subsistence needs are constrained. Protection of the park has increased the populations of deer, tigers, wild boars, and rhinoceros to the degree that they now pose threat to standing crops. Thatch, grazing and fuelwood, once freely available are now limited and access is severely restricted within the park.

Crop predation by park wildlife ranges from 10 to 90 percent, and despite pervasive watchtowers in fields, little can be done to keep animals from the succulent rice, corn and mustard. Although grazing restrictions have reduced the estimated 20,000 head of domestic stock using the forest for grazing at the time of Chitwan's gazetting, farm animals still constitute as much as 30 percent of Tiger kills (Mishra and Jefferies 1991). One buffalo represents four years savings to a local farmer. Current and future production may depend on the animal's draft power, and if killed within the park, the owner receives no recompense. That humans occasionally fall prey to park animals does not help engender a pro-conservation attitude among local residents.

Employment opportunities while not insubstantial fall short of the panacea some had foreseen. Lodges, both inside and outside the park, and the DNPWC itself are the largest emplcyers. The demand is mostly for menial service labor for the tourist industry and for temporary labor within the park itself. Of more direct benefit is the policy of opening the park to grass cutting for two weeks of the year. By reducing the intensity and extent of annual fires, the grass cutting is probably environmentally neutral. The estimated 13 million rupees in benefits going to local populations is sufficient stimulus that some villages are beginning to protect grasslands in the neighboring buffer zones.

********** - END BOX - **********

In 1976 park management responded to local demand for thatch by opening the park to grass cutting for 20 days each year during the winter season. This marked an initial turn in the evolution of

the park management concept from authoritarian to people welfare oriented views. But it also pointed out the potential problems of softening regulations and underscored the need for some control. The grass cutting duration was shortened to 15 days in 1981 to reduce firewood smuggling.

As surrounding natural areas were more completely converted to cropland, the park's importance as a legal and illegal source for villager needs increased. Grazing, grass cutting, poaching, logging and hunting, when coupled with tourism, all directly conflict with the park's objective of habitat preservation. The loss of human life, livestock and crops to predation from park animals contribute to an overall equation of people-park conflict. Prohibitions against fodder cutting and firewood collection, farming in areas susceptible to riverbank erosion and grazing became sources of complaint. It is very difficult for villagers to understand that although wildlife may damage their crops, they must not kill any wild animal in return. They remain unconvinced of the rationale of protecting forest and wildlife (Sharma 1991). As it evolves away from its top-down preservationist management style, RCNP continually attempts to balance the competing demands of conservation and development. The various development activities examined by this evaluation support, albeit in somewhat piecemeal fashion, this attempt.

Policy and Institutional Context

A number of important policy initiatives stemmed from the implementation of the provisions of National Parks and Wildlife Conservation Act:

- The creation of the network of national parks and protected areas in all major ecological regions of the country.

- The creation of a separate Department of National Parks and Wildlife Conservation (DNPWC) as a branch of the Ministry responsable for forestry and conservation in the country. The GON established less cumbersome bureaucratic procedures to the DNPWC to encourage greater autonomy and easier and more direct access to international funding.

- The initiation of a people oriented approach in national park management. For example, the Himalayan National Parks Regulations provide the local people with access to national park resources for subsistence living. Annual grass harvests are allowed in all lowland national parks and wildlife reserves. The Annapurna Conservation Area project in the central Himalayas emphasizes a "bottom-up" approach (Hough and Sherpa, 1989), and in the Makalu Barun National Park in the eastern Himalayas, a

buffer strip, designated as a conservation area, containing natural areas and settlements designates priority areas for human needs.

- The preparation of a core of highly trained park officials and provision of resources and opportunities for high quality research.

- The involvement of the Royal Nepalese Army in the protection of national parks and reserves.

- The opening of the non-governmental organization, King Mahendra Trust for Nature Conservation (KMTNC) to solicit donations and support of wildlife conservation.

Successive amendments to the National Parks and Wildlife Conservation Act show a steady increase in the concern for the local peoples' resource needs and the role of parks in supplying them. Amendments include provision for the creation of *Conservation Areas* designed to maintain the natural environment while permitting sustainable multiple use of natural resources. In conservation areas, local populations are assumed by managers to be an existing presence with legitimate rights. The conservation area management usually involves handing over some of the responsibilities to non-government organizations who are expected to meet the specific needs of local populations better than the government.

The fourth amendment to the Act, in 1993, established a new category of protected area, the Buffer Zone Area. The Act authorizes User Group Committees to manage and use resources found in those protected area environs designated as "buffer zones". This 1993 Buffer Zone Management Amendment (BZMA) contains a provision for the sharing of from 30 to 50 percent of park revenue with local people. As a revenue sharing arrangement designed to promote community development work, the BZMA further underscores the evolution toward community-based management (Appendix D).

With assistance in its preparation from the World Conservation Union (IUCN), a National Conservation Strategy for Nepal was endorsed by His Majesty's Government in 1988. It identifies gaps in present protected area system; it points to the need for a comprehensive management plan for RCNP and other protected areas; it recognizes the significant burden that wildlife can place on local people, either through injury or crop damage; it recognizes social and economic hardship due to restrictions placed upon the customary harvesting practices; and it states the need for development in the settled areas surrounding parks.

Despite the difficult problems facing the protected areas of Nepal, the trend in management indicates a new and enlightened appreciation for the problems of local peoples and willingness to address these problems through innovative programs. While discussing

these changes with the CDIE team, the Acting Director of the Department of National Parks and Wildlife Conservation advocated an optimal "triumvirate" involving local committees, NGOs, and the DNPWC staff which would manage both the park and the surrounding "buffer" areas. But despite this willingness concrete examples of change remain limited and tentative.

Three of Nepal's protected areas--RCNP, Makalu Barun and the Annapurna Conservation Area--have offered valuable "laboratories" for the testing of various management strategies. Each area represents some point on a continuum between authoritarian conservationist and fully participatory community-based management strategies. NGOs have been the main engines behind these management paradigms, and some like Woodlands Mountain Institute (WMI) and IUCN have been heavily supported by USAID.

The USAID Assistance Approach

Although the Nepal USAID support to biodiversity conservation has been diverse and relatively longstanding, the specific activities are diffuse and thus difficult to evaluate. Based on prior evaluations and communications, CDIE selected Royal Chitwan as the focus for the field case study. The intent was to assess Chitwan as a particular model of protected area development. USAID has supported Chitwan's development, but it was never intended that the support be comprehensive. Consistent with this pattern, the USAID funded Biodiversity Conservation Network is directing another $400,000 to the country, much of which is bound for Chitwan's buffer zone development.

Nepal's concurrent experimentation with several protected area management models makes it a particularly interesting case study. USAID has given support to these other models (in Annapurna as minor donor and in Makalu Barun as the major grantor for the start-up phase). To set Chitwan in context, we sometimes make comparisons and contrasts with these other approaches. Some findings pertain, therefore, to the USAID's overall support to biodiversity conservation in the country.

USAID's support can be broadly divided into five categories: 1) influencing policy concerning the conservation of biological diversity and protected areas; 2) strengthening NGO capacity; 3) environmental education, or increasing awareness of the value of protected areas, 4) support for greater local participation in park management through economic and social incentives in surrounding communities and buffer zones; and 5) support for technical innovations. USAID supported the initial creation of RCNP. A series of specific activities affecting RCNP is summarized in the Table 1.

Table 1

SUMMARY OF USAID SUPPORT

PROJECT	FUNDING MECHANISM	YEAR	APPROX. AMOUNT ($US)
Tiger Terai Ecology Project	Smithsonian Institution/WWF	1973	N/A
NECTARI Feasibility Study	WWF	1987-1989	30,000
Conserving Megafauna workshop	Biodiversity Support Program	1990	N/A
NCRTC (NECTARI)	King Mahendra Trust/WWF	1989-1992	130,000
Local NGOs	Umbrella Grant to IUCN	1990-1995	520,000
KEEP	IUCN (NEMP)	1992	subgrant
ECCA	IUCN (NEMP)	1992	subgrant
Crocodile Conservation	IUCN (NEMP)	1992	subgrant
Biodiversity Database	IUCN	1992	5,000
Royal Chitwan Guidebook	King Mahendra Trust	1991	N/A
Makalu-Barun NP and ICDP	Woodlands Mountain Institute	1989-1994	700,000
Annapurna Conservation Area Project	WWF, PSCT to R. Jackson	1989-1993	242,000
National Conservation Strategy	HMG/IUCN	1988	40,000
Training of Park Staff	NCTRC, RCUP, IOFP, DTP	1989	N/A

Policy development. At the central planning level USAID provided support to the World Conservation Union (IUCN) to prepare and begin implementation of Nepal's National Conservation Strategy (NCS). By employing funds of the centrally funded Environmental Planning and Management Project, technical staff at the USAID mission were able to provide important direction and a technical assistant to this effort which has now been integrated with the National Planning Commission. NCS strategies are evident in the Master Plan for the Forestry Sector program for genetic conservation (1988). In addition to the support to Chitwan outlined in Table 1, grants helped develop two other protected area management models: the Annapurna Conservation Area Project (ACAP), and the Makalu-Barun

Conservation Project. Indirect support also enabled local NGOs to influence more specific legislation, such as the recently adopted buffer zone legislation for Royal Chitwan National Park.

Strengthening NGOs. USAID supported the IUCN in its effort to implement the National Conservation Strategy. WMI received support to study and develop methods to preserve targeted ecosystems in an environmentally and financial sustainable manner. USAID's support to the World Wildlife Fund (WWF) initiated efforts to prepare ACAP staff to assume protected area management responsibilities for Annapurna and focussed in Chitwan on creating a permanent international conservation, training, and research institute -- Nepal Environmental Conservation Training and Research Institute (NECTARI). When taken over by the King Mahendra Trust for Nature Conservation (KMTNC), NECTARI was renamed the Nepal Conservation Research and Training Center (NCTRC). USAID continues to provide NCRTC with technical support through a grant to the IUCN. Among other activities, NCTRC has been involved in the training of park staff as well as local guides for tourists.

Environmental Education. USAID supported grass-roots efforts at biological conservation in Nepal through environmental education programs. The USAID-supported Environmental Camps for Conservation Awareness (ECCA) has sought to generate a sense of awareness of the value of conservation among the country's youth. ECCA teaches young people responsible outdoor behavior, provides insights into alternative sources of energy, and encourages new research and developments in the fields of energy conservation and farming methods.

KEEP, or the Kathmandu Environmental Project, has focused on the education of tourists, who have the potential for wide-ranging impacts upon the country's biological resources. KEEP established the Travel Information Center to help advise them on "gentle or minimum impact" trekking.

Also directed at tourists is the USAID-supported *Royal Chitwan National Park Wildlife Heritage of Nepal*, by Hemanta R. Mishra and Margaret Jefferies (1991). This is the single most comprehensive description, written for the lay person, of the park's plant and animal life. The book's format includes numerous color photographs, which directs it toward conservation education of the tourist and general reader.

Local participation and buffer zone development. USAID's support to community and buffer zone development has been through NGOs. NCTRC support helped launch its rural development activities, such as reforestation and community woodlots, in the peripheral zone. Biogas, cookstoves and latrines offer specific interventions that USAID has supported through NGOs working with Chitwan area communities. These initial activities have lead to a recent

agreement to expand bufferzone activity through a $633,000 grant from the USAID funded Biodiversity Conservation Network.

Technical innovations. In support for basic research, USAID funding has permitted the establishment of a wide range of baseline data that has greatly enhanced Nepal's conservation of endangered species, especially the tiger, the crocodile and the rhinoceros. One of the early initiatives in tiger research, the Tiger Ecology Project, helped lay the foundation of understanding on tiger population and distribution. Similarly, support for the Crocodile Conservation Strategy has encouraged the development of a long-range plan for the muggar crocodile. In a broader sense, USAID's contribution to the development of a country-wide database on Nepal's biological resources has begun to bring recognition of the need to protect a wide array of species within Nepal.

In sum, Agency support to biodiversity conservation and to Chitwan in particular, is the product of creatively allocating limited resources where an explicitly defined and broadly supported USAID program objective was absent. Through continuous involvement and commitment, the process provided a significant opening for USAID in the agenda setting process of the DNPWC. This approach to programming is illustrated by the establishment in early 1993, of a "Biodiversity Working Group." The Group and its Steering Committee include Government of Nepal (GON), NGO, and donor representation and was established with technical support from the Nepal IUCN office and with central USAID (Biodiversity Support Program) funds. In another instance, the "convergent or hybrid model" of park management being developed through a grantee, the Woodlands Mountain Institute, in collaboration with the DNWPC demonstrates the continuing effectiveness using non-traditional funding -- through NGOs, through close attention to central and regionally funded biodiversity activities, and through policy dialogue. The maintenance of a small line item in the USAID mission budget and the presence of a PSC biodiversity conservation specialist helps insure integrity and continuity across the diverse activities.

Evaluation Procedures

This evaluation investigates the hypothesis that by progressively giving local communities a personal stake in a park's natural resources, those communities will work actively to protect the diverse biological resources in question. More specifically, it tests whether USAID has influenced the evolution of such a model by raising conservation awareness, improving the scientific basis for management, providing economic or other incentives to change behavior, and by reducing tourism's threat without undermining the revenues it generates. It asks to what degree Chitwan already represents a model where a stronger partnership between government and local communities bordering the park leads to enhanced

conservation and more sustainable use of the park's buffer area's resources.

The field procedures for examining this hypothesis (specified in Appendix A) consisted of five main parts:

- Key informant interviews and secondary source review to establish the policy and institutional framework for Chitwan and Nepal's protected areas program.
- An investigation of activities taking place at the periphery of the park focussing on new technologies as well as environmental awareness and educational programs.
- Observation and study of actual park management by the government and other concerned parties based upon interviews, observations, and data from park records, key informants in the Chitwan area (as well as from complementary sources in Kathmandu and the Annapurna area).
- Extensive interviews with people living around the park including both those who were and were not involved in any development activities.
- A survey on the lodge and tourism industries (See Appendix D) that identified the potential and present perils of tourism around the park.

3. EVALUATION FINDINGS: PROGRAM IMPLEMENTATION

This evaluation examines the following strategies as determinants of the performance of biological diversity conservation programs receiving USAID support:

- **Institutional strengthening** -- the creation and strengthening of local and national level public agencies and non-governmental organizations to carry out programs aimed at forest habitat and wildlife protection;
- **Technological development and change** -- the introduction of new practices and techniques compatible with forest habitat protection;
- **Awareness and education** -- the increase in local and national knowledge and understanding of the value of forest habitats;
- **Policy change** -- the change in national policy for forest habitat protection and wildlife conservation that identifies and controls sustainable resource use within protected areas and enhancement of market incentives for habitat protection.

The evaluation assesses the ways in which USAID-supported program in Nepal used (or did not use) these strategies to foster habitat and wildlife protection. This section examines the strategies and the conditions created through their implementation.

Institutional Strengthening

Unlike forestry and agriculture, USAID has not funded a major public sector institution building project as a strategy for conserving biodiversity. Support to Department of National Parks and Wildlife Conservation (DNPWC) has been indirect through manpower training under the Resource Conservation and Utilization Project (RCUP) or the Institute of Forestry (IOF) Project, through grants to NGO partners, and through USAID mission staff involvement in policy setting and planning. In an effort to strengthen the DNPWC as the lead institution in protected area management, USAID did provide grant support through WMI for the collaborative development of a state of the art model for the new Makalu-Barun National Park (adjacent to the Everest area). USAID has attempted to strengthen local and international NGO capacity as part of an overall strategy. A key indicator of strengthened GON capacity is the degree to which tourists and local resource users are accommodated in the protected

area system without compromising conservation objectives. Secondary indicators include capacity to maintain park infrastructure and administrative systems, to carry out park management operations such as research and enforcement. Strengthened (local and international) NGO capacity would involve the ability to represent local populations' interests in setting park and buffer zone management programs.

Progress away from a narrowly authoritarian model of strict preservation is evident within the DNPWC.

USAID-supported programs have contributed to institutional changes that have helped Nepal move from legally protected hunting grounds to the creation of the national park and wildlife conservation system. RCNP still leans toward a centrally managed scheme. It is under the jurisdiction of the DNPWC, although historically the King Mahendra Trust for Nature Conservation has managed research activities within the park. Adding to a generally authoritarian management regime of the park is the Royal Nepalese Army, stationed there to limit illegal activities (poaching, wood and grass collection, for example) within the park's borders. The Royal Nepalese Army, whose presence may well have been necessary initially at least to deter virtually unchecked poaching, continues to execute its mandate of strict protection without regard for its relationship with villagers. Contact with local populations is through arrest and detention, therefore, the army is seen almost exclusively as an antagonist.

Park management authorities have expressed tremendous interest in modifying the strict preservationist model to make it more workable. Cumulatively USAID-supported activities have strengthened this trend. Park rangers, unlike the army, are directly under the jurisdiction of the Department of National Parks and Wildlife Conservation and have a generally better relationship with the villagers. In fact, villagers sometimes serve as paid informants to the park rangers to help identify poachers. Even the army battalion commander sees the military's role as "transitional." Yet, because his rank is higher than that of the park warden, institutional conflict resolution inevitably gravitates toward top-down solutions. In Chitwan good relations between the warden and the army commander minimize these structural problems. The recent Nepal Environmental Policy and Action Plan (HMG 1993) calls for further strengthening of the DNPWC capacity to act as the main institution responsible for protected areas.

Much depends on the role DNPWC takes with relation to communities outside the park. While villagers' use of the park remains contentious, tourists and concessions within the park enjoy relatively free access despite having a significant impact upon the ecology. By enabling park management to work with local communities, the new buffer zone legislation should help empower DNPWC to better integrate parks into an overall regional development context.

Through its grant to WMI, USAID has encouraged the DNPWC to consolidate the lessons of its earlier experience regarding the importance of including local populations in the planning and management of the country's protected areas. In Makalu-Barun, the DNPWC takes the lead agency role in working with an NGO to manage an area that includes both a core national park area where the primary aim is nature conservation and a surrounding conservation area where community-based resource management activities will be tried. These core management functions are to be supplemented by tourism management and scientific research. Within the park itself a Strict Nature Reserve is surrounded by less rigorously preserved, "Protected Landscape Area" that may include some settlements. With this participatory approach to park establishment, and the multi-zone model that came out of the effort, the Park Service has thus far been able to proceed without an accompanying contingent of the Royal Nepalese Army. According to the project director, villager participation was already quite high and dialogue with villagers was helping to define the rules of allowable behavior within the different land use units. The CDIE team did not visit the field site because park management and community development activities were only just moving from start-up to a full implementation.

With its initiative in the Annapurna region, the DNPWC embarked on an even more radical experiment at replacing top-down authoritarian management. Annapurna, to which USAID made a modest contribution, was established not as a national park but as a Conservation Area with the specific intent of eliminating policing in favor of a participatory model of sustainable community development. Local users including lodge owners are encouraged to establish mechanisms for self-regulation. To insure minimal bureaucratic involvement, management authority was devolved to an NGO, KMTNC, for a ten-year period. When the model has been firmly established, it is intended that management will revert to DNPWC.

USAID support to NGOs has encouraged experimentation with a variety of approaches to protected area management in Nepal.

Three of Nepal's premiere protected areas--RCNP, Makalu Barun and the Annapurna Conservation Area--serve to test different management strategies, and, as mentioned above, NGOs figure prominently in each.

In Chitwan, USAID has fostered the development of several NGOs, most notably the King Mahendra Trust for Nature Conservation (KMTNC). As an indigenous environmental NGO, the Trust's efforts have focussed on conservation education, wildlife research, and community development activities in the areas bordering the park. KMTNC, because of its ties to the royal family and its recent dissociation with state politics, does not yet meet USAID NGO certification criteria and USAID support has been indirect through other NGO grants. Nevertheless, KMTNC has embarked on an active campaign to solicit funding from other sources. USAID's NGO support

allowed Chitwan to solicit backing for conservation by providing social and economic incentives such as biogas or village woodlots. The umbrella grant to IUCN has served to strengthen smaller NGO's in the Chitwan area.

The Annapurna Conservation Area Project (ACAP) is administered by the KMTNC with funding from trekking fees and numerous donors including at one time, USAID. As a conservation area "operator," KMTNC has been accorded a ten year mandate by the GON to establish a new approach in the region. Known locally as ACAP, the KMTNC has established offices throughout the area (which has now expanded to include the entire Mustang District). ACAP works through user committees to combine resource management, alternative energy, and small-scale conservation with social programs to strengthen well-being and cultural integrity. A core assumption of the new approach is that conservation education of tourists, tour and lodge operators, and local residents will insure sustainability beyond the Trust's mandate. Sixty percent of all tourist revenues are channelled into ACAP to support community development activities. While ACAP was generally well-received in local villages, its emphasis on tourism and trekking revenues may have resulted in a lack of sensitivity to indigenous environmental management practices.

USAID support, to the NCTRC (and to its predecessor NECTARI), has established a viable research support capacity in the Chitwan area.

Through the Tiger and Terai Ecology Projects, NCTRC inherited, developed and maintains a functional research support facility and a stable of accomplished research support technicians. Upon this base USAID and others (WWF, Smithsonian) have supported research activities valuable to conservation of the park's fauna and flora. NCTRC technicians' skills are sufficiently advanced that the DNPWC decided recently to use its own GON funds to send its park rangers and game scouts to NCTRC for in-service training.

Twenty five game scouts and lower level conservation workers from almost all national parks and reserves were provided historical training within Royal Bardia National Park. The goal of the training was to provide knowledge on park rules and regulations. They were also trained on various ecological, management and park patrolling procedures. Management techniques imparted include the treatment of wounded animals and the capturing of man-eating tigers.

USAID-sponsored participant training of senior staff and local training of park rangers has improved the technical capacity of DNPWC's staff.

One component of USAID's Resource Conservation and Utilization Project (RCUP) provided training for foresters who wished to

specialize in park management or wildlife ecology. This reflected an increasing awareness of the need for specialized technicians. The current Acting Director of the National Park Service, for example, left his post as Chief Warden in Langtang to pursue his Doctorate at the University of Florida under RCUP. Since returning in the late 1980s, he has been instrumental in working with WMI to develop the balanced integrated conservation and development approach being applied to the USAID supported Makalu-Barun National Park and Conservation Area.

The Institute of Forestry Project promoted curriculum reform at IOF that led to an increased emphasis on wildlife, protected area, tourism, and recreation management. In essence, by doubling the course load at the certificate level, protected areas, tourism and recreation were added to the older singular focus on wildlife management. Applied social sciences, communication skills, and community forestry were also given new emphasis. This reform implemented strategic policy changes reflected in the Master Plan for the Forestry Sector (1988). The team encountered two Bachelor's level students who were engaged in preparing senior theses on people-park themes for presentation to the IOF faculty. Field training brings students from the classroom to the parks. In Chitwan, three Groups of certificate level and one group of diploma level students from the Institute of Forestry have joined the training course on Radio Telemetry and Research Exercises a part of their regular curriculum.

Technology Development and Change

Through NGO-implemented community development activities, USAID has encouraged the development of alternative technologies for buffer zone dwellers.

Buffer zone development around Chitwan has involved both social and alternative livelihood activities. Social programs have been centered on latrines, improved cookstoves, and biogas generation. Alternative livelihood activities have involved villagers in woodlots and grass cutting.

NCRTC has established one nursery in Bachhauli and provided support for Janakpur nursery in Kumroj. NCRTC also has a small nursery in its office premises. Since plantation activity is being increased, NCRTC now has capacity to produce 300,000 saplings per year. Based on an analysis the previous year's expenses, CDIE estimated the production cost of one sapling to be about NRs. 1.18.

USAID-supported biological research enabled better ecological management of RCNP's resources.

A program of research concerning the ecology of the tiger and its prey species was initiated in 1973, with USAID support, by the

GON, the Smithsonian Institution and WWF. This was superseded in 1984 by the USAID-supported Smithsonian-Nepal Terai Ecology Project, the scope of which encompasses broader aspects of ecology, including the relationship between habitats, invertebrates, vertebrate and human population. The ecology of the Indian rhinoceros and the tiger have been extensively studied (Laurie 1978, and Dinerstein and Price 1991). Studies financed by USAID through the International Institute of Environment and Development on grassland ecology have been carried out by Lemkuhl (1988).

In the early 1970s, the Smithsonian Institution, with support from WWF, USAID and several other NGOs, instituted the first comprehensive study of the Bengal tiger in Royal Chitwan National Park. Prior to this time, most of the scientific information had been on the better-known rhinos. As the tiger neared extinction in neighboring India, the importance of the Nepal population to the survival of the species became apparent. The Tiger Ecology Project sought to document the basic ecological dynamics of the tiger, including its distribution, population and relationship to prey in the vicinity of Royal Chitwan National Park.

Research activities on rhinoceros, including their relocation to Royal Bardia National Park, have contributed to protection of the park's plants and animals (Appendix E). In 1991, Anum R. Joshi initiated the on-going sloth bear study in Royal Chitwan National Park. The University of Minnesota Ph.D. project examines the factors limiting the abundance and distribution of sloth bears in lowlands of Nepal.

The preliminary results for the sloth bear study already offer insights into the home ranges of the animals, seasonal distribution and dietary preferences. All these factors are essential for eventually developing a management plan for the species. The final results of the study are expected to come out in second half of 1994.

Other Research Activities include bird population monitoring and a migratory water bird survey jointly initiated by RCNP and NCRTC. Ungulates and carnivores within the park are also being monitored. Projects also include habitat management and restoration projects (Nandan tal Restoration and Dam Construction in Lami Tal).

The ecological studies of rhinos have provided the scientific rationale for the translocation of the animals to Bardia National Park and helped to reestablish a population there.

The rhinoceros of RCNP have been the subject of many studies. These include Laurie 1978; Gyawali 1986; Joshi 1986; Dinerstein and Wemmer 1988; Dinerstein 1991; Dinerstein and Price, 1991 (See Appendix E).

In particular, USAID contributed to the completion of a census of the greater one-horned rhinoceros in Nepal in 1988 by Eric Dinerstein, the results of which were published in demography and habitat use by greater one-horned rhinoceros in Nepal (Dinerstein and Price, 1991). Studies have documented the dangers facing highly concentrated populations from epidemics and poaching within RCNP and established a sound scientific basis for translocating the animals in secure areas. Consequently, populations have been established in Royal Bardia National Park, western Nepal. This should contribute to a more sound basis for the species' preservation.

USAID support for the research on the biogeographical classification of Nepal and for the design of a database has opened the way to establish an inventory of the country's species.

The basic foundation for planning the wise use and conservation of a country's biological resources is to know in detail exactly what is present in both its numbers and distribution. Only this information can point the way to what particular areas (and their resources) are in most dire need of protection. Nepal is especially challenging in this regard because of the country's extreme geographic (and therefore, biological) diversity. So complex are the overlapping ecological zones, that even the basic "biogeographical" description of the country remains unresolved. Without an agreement among scientists on a basic "ecological" description of the country, formulating an inventory becomes difficult. These are the problems being addressed in the on-going effort to build a biodiversity database for Nepal. According to one classification, there are some 35 forest types alone in the country (HMG 1993). A consensus on classifications must be established before an effective inventory can be undertaken of the country's plants and animal species. Through the centrally-funded USAID Biodiversity Support Program (BSP) support to Nepal's Biodiversity Working Group, USAID support has helped to get this discussion underway.

The support has also helped in the design of computer software for the database that will eventually store the inventory. The DNPWC stressed the need for greater GON involvement in this effort.

USAID subsidies have resulted in an increased number of biogas plants that will reduce the need for fuelwood from forested areas.

Through the work of the local NGO Integrated Rural Community Development Center, Self-Help Biogas Construction Programme, biogas has now been demonstrated as a viable alternative to fuelwood for the residents around RCNP. A number of the constraints to the greater use of biogas as an alternative energy source are currently being addressed. These constraints include a lack of awareness

about the biogas plants, high installation costs, lack of both technical support from NGOs in the field and interest on the part of foreign donors.

The USAID supported Alternate Energy for Biodiversity Protection project has begun to introduce low costs biogas plant technology to the local communities in the vicinity of RCNP. These project sites benefit from a pilot biogas plant built and operated for several years near Bharatpur. The project locations include Gunjanagar, Patihani, Jagatpur, Kumroj, and Kathar. Although limited in number, the installations are highly visible and therefore proved to be an effective way of publicizing the technology. Almost every person interviewed in the vicinity of RCNP had at least heard of the technology and were impressed with the need for less wood. The vast majority of people actually knew someone with a plant and were familiar with how they worked. Therefore, while it may be early to measure the actual impact of biogas technology by the decreased pressure on the forests for wood, the plants have undoubtedly had a significant impact on the way people think, showing that, with minimal support and new technology, thee are alternatives to the seemingly endless cutting or collecting of fuelwood from hard-pressed forests.

AID funding has contributed not only to the development of biogas technology, but has assisted in economic feasibility studies of this alternative technology. Studies show that a family of four needs a 4.5 cubic meter biogas plant to eliminate virtually all their fuelwood needs. Such a plant would require the manure from four cows. Each biogas unit costs approximately 13,500 Nr. In the vicinity of RCNP, USAID/IUCN project provides the same 7000 Nr subsidy for each biogas plant that the GON through the Asian Development Bank, offers to Terai and Middle Hills farmers. Each family is expected to contribute about 3,500 Nr and take out a loan for an additional 3000. Because families have had difficulty repaying this 3000 Nr on time, the USAID/IUCN program has begun an experimental option in which families can repay the loan with 3000 tree seedings they have grown. It is too early to know if this option will alleviate the families' loan burden which would also support buffer zone reforestation activities.

The benefits to household biogas production are numerous:

1. The use of biogas can totally eliminate the need for fuelwood in a home. Each cubic meter of methane produced saves about 3.6 kg of firewood. A small biogas plant produces enough gas to save 16,200 kilograms of fuelwood per year. By using biogas, not only is wood from the forests saved, but so is the intense labor, mostly provided by women household members, required to gather it. Labor savings of about 2,600 hours per household per year, can then be put into growing crops or other productive uses. Furthermore, dependency on

biogas encourages farmers to keep their cows confined so that dung may be more easily collected and used.

2. Because the percentage of nitrogen in treated manure is significantly higher than in fresh dung, the need for commercial fertilizer is greatly reduced or eliminated. This savings in commercial fertilizer (and fuelwood) totals about 3,300 Nr a year. Treated manure also eliminates insect pests, thereby offering prospect of increased production without the use of dangerous pesticides.

3. Health benefits include the reduced smoke in homes from firewood.

Because initial investment capital and cost recovery are problematical despite the economic, environmental and health advantages, subsidies are required to make biogas plants readily available. The widespread adoption of this technology promises to offer a broad range of conservation, production and health benefits. The program was intended as a pilot activity to demonstrate what could be achieved under a more comprehensive buffer zone development program such as that envisioned by USAID under the Biodiversity Conservation Network. The adoption of biogas technology should be accelerated by the implementation of the revenue sharing provisions in the BZMA.

USAID support to the muggar crocodile (*Crocodylus palustris*) conservation project has helped lay the scientific and technological foundation for planning a recovery strategy for this endangered species.

Nepal has two indigenous species of the family Crocodylidae, representing two existing genera. The muggar, *Crocodylus palustris* is listed as endangered and on CITES Appendix I. It exists on the Indian subcontinent and has been severely affected by habitat destruction, hunting, entrapment in fish nets, and egg predation.

With USAID support, baseline research is being conducted for the building a number of breeding/rearing pools in, or adjacent to, RCNP and the restoration of a number of closely associated ponds for the purpose of muggar and wetlands habitat conservation. For example, while the distribution of the muggar has been determined for India, only recently have efforts begun to do so in Nepal, where USAID studies have recently been conducted to map the historical range of the muggar as well as it current range. Early results are affecting management decisions; more definitive findings are expected to be available in late 1994.

In addition, several other important initiatives have been completed or are underway. An application for a site has been submitted to the Ministry of Forestry, and a design for a water

source to the project site has is being planned. An engineering assessment of the planned site has been completed.

Tourism has been built into the project design as a means of generating self-sustaining revenue, and fees are already being collected. Crocodile specialists have visited sites in India where successful crocodile conservation projects have an established record of success. The director of the project has received extensive formal training on crocodile conservation.

The process has been initiated for reclassifying the muggar to permit ranching under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

Awareness and Education

It has long been recognized that conservation begins with awareness--an awareness, first, of *what* needs to be protected; and secondly, *why* it needs to be protected. USAID channelled its efforts to raise awareness and education in the interest of improved conservation of parks and protected through several NGOs. In Chitwan most activities fell under an umbrella grant to IUCN who administered the sub-grants but some were undertaken by KMTNC . Direct grants for conservation education are a part of USAID's support to WMI and previously to others in Annapurna. Two groups are targeted by conservation education programs: local populations and tourist-related. The assessment asked whether conditions for raising the awareness in these groups had changed and whether this had resulted in changed behavior vis-a-vis the conservation of park resources. The more important of these efforts are characterized below.

USAID support helped NCTRC expand its research role to include education, awareness, and outreach activities.

NECTARI became a forum, both through publications and public presentations, for disseminating conservation information. Later, the organization became actively involved in training scientists as well as non-scientists (park guides) in the value of the park and wildlife to the environment. NCTRC sponsors lower impact, more ecologically sensitive tourism through its training program. For example, 60 previously trained local guides were given one week refresher nature guide training on July 12 - 19, 1993. The main purpose of this training program was to provide up-dated information on Royal Chitwan National Park and its new polices for tourism management. The Warden at Sauraha, a lecturer from Tribhuvan University, and others have given lectures in specialized fields relating tourism to protected area management. A field trip was organized to Balmiki Asram western border of RCNP to provide knowledge on cultural heritage of RCNP. At the end of the training

session, participants presented that reflected increased knowledge and awareness.

Also in addition to its wildlife research, NCTRC organized training sessions to expand the impact of its community development projects. A two day workshop on vegetable farming and management was held at the premises of NCRTC, Sauraha. The workshop was designed to educate farmers on growing vegetables in the summer season. The workshop provided insight on soil preparation, use of pesticides and fertilizers and the probable disease and their prevention and control.

A one day workshop on community plantation was held at the premises of NCRTC. The aim of this workshop is to make local people aware of community plantations. The workshop provided knowledge on process of plantation, legal procedure, formation of users group committee and management of plantation sites to the participants. Warden at Sauraha, officers from DFO office gave lectures on the above fields. Discussion was held between old and new user's group to exchange ideas regarding community plantation and its importance to the local community.

USAID has increased conservation awareness through the Kathmandu Environmental Education Project (KEEP) and the Environmental Camps for Conservation Awareness (ECCA), and through support for a wildlife guide book to RCNP.

The Kathmandu Environmental Education Project is an USAID-assisted NGO that provides cultural and environmental information to tourists. The project reaches an estimated 90 tourists a week during peak season through its Travelers Information Center in Kathmandu. A coffee shop located within the center attracts visitors, hands out brochures and encourages conversations between tourists and staff. The sale of KEEP t-shirts with a "minimum impact" message, bio-degradable soaps, sun cream products, stationery from recycled papers, environmental calendars, etc spread the KEEP message as well as provide additional money for the center's operation. KEEP has now achieved a reputation as among the best, most easily accessible sources of environmental and cultural information for tourists.

ECCA is part of a program that has successfully brought environmental education to several communities around RCNP. While biogas plants spurred neighbor-to-neighbor environmental education, ECCA offered a different approach. It sought to convey environmental awareness by reaching children outside the family, who then returned to "teach" their parents. These efforts focused on two technologies -- smokeless stoves and latrines. Pilot projects were undertaken at schools. The students then returned and explained it to parents. The program is built upon the principle that a few experts can educate a larger group of youth who can then in turn teach even larger numbers of children.

In January and February of 1991, two 5-day camps were held at Chitwan District, one at Narayangaharh and another at Meghauli. During the two camps, 40 children were exposed to a wide variety of programs that enhanced their understanding of the natural environment, the processes contributing to its deterioration, and the possible solutions and actions needed to curtail negative impacts and facilitate reclamation at the community level.

Using prototypes and hands-on techniques, the children had an opportunity to learn about improved and smokeless cookstoves, water filter using local materials, water borne diseases, water and other natural cycles, national parks and their ecosystems, importance of protected areas, and soil erosion due to river-bank cutting. They undertook a socioeconomic survey of the local villages, and made an inventory of local plants, animals, and in birds.

In conducting these activities, children and counsellors hiked through the park, spoke to local villagers, learned to use microscopes and binoculars and to read maps. Audio-visuals in the form of flip charts, slides and posters were used extensively. Two improved cookstoves were installed in two homes during the camps. Several latrines were also built.

On the final day of each camp, a Parents' Day was organized. Practically the entire village turned out to watch the campers perform skits and recite poems written on the basis of what they had learned during the five days. The children displayed the materials produced and explained them to their parents.

Separately, the project generated interest throughout the communities, especially in the use of smokeless stoves and latrines. Based in part upon the success of this project, the Asia Development Bank began offering subsidies to villagers who built latrines.

Policy Change

USAID support to international and local NGOs contributed to successful lobbying for new buffer zone and revenue sharing amendments that recognize and make provision for the legitimate needs of populations residing near parks.

USAID funds distributed through IUCN empowered local NGOs to lobby for the successful passage of the buffer zone and revenue sharing amendments to the law. Despite not having clearly defined and continuous program of involvement in the country's management programs for protected areas, USAID has managed to affect GON policy by following its seed money to developing the National Conservation Strategy (NCS) with an umbrella grant to the IUCN to support the NCS programs. With the NCS integrated into the National Planning Commission and staffed by Nepalese experts, IUCN is able to play an important role in the national level policy and planning process.

It has recently broken biodiversity out as a separate program area, and this complements programs planning, environmental education and public information. The Public Information Program, in particular, has provided direct and indirect support to the Nepal Forum for Environmental Journalists.

USAID's support of the National Conservation Strategy (NCS) helped place new emphasis on conserving Nepal's biological diversity.

In 1980, the World Conservation Strategy (WCS), prepared by the IUCN with the assistance of the World Wildlife Fund and the United Nations Environment Program (UNEP), was endorsed by government officials and political leaders in 35 simultaneous ceremonies throughout the world. One point highlighted in the WCS was the need for preparation and implementation of national conservation strategies.

Subsequently, strong endorsement of the WCS by the GON resulted in a decision to initiate the formulation of a National Conservation Strategy for Nepal. Phase I took the form of a Prospectus published in 1983. The Prospectus, following the principles and guidelines described in the WCS, set the scene for Phase II, the formulation of a comprehensive National Conservation Strategy for Nepal. Throughout the process, IUCN's participation was assisted by USAID, the Canadian International Development Agency, and the Swiss Development Cooperation.

The NCS for Nepal had four objectives:

1. Satisfy the basic material, spiritual and cultural needs of the people of Nepal, both present and future generations.

2. Ensure the sustainable use of Nepal's land and renewable resources.

3. Preserve the biological diversity of Nepal in order to maintain and improve the variety of yields and the quality of crops and livestock, and to maintain the variety of wild species, both plant and animal.

4. Maintain essential ecological and life-support systems, such as soil regeneration, nutrient recycling and the protection and cleansing of water and air.

The principle of biological conservation envisioned in part the evaluation and strengthening of Nepal's protected areas. Specific problems identified by the NCS concerned the jurisdiction of protected areas, sufficient manpower to maintain them, village conflict, conservation awareness, and baseline data on the protected areas. Through this priority setting exercise, USAID was able to

influence the guidelines that later became the basis for USAID's support for biological conservation in Nepal.

The NCS also recognized the importance of preserving biological diversity outside of protected areas as well. One focus of this effort was to preserve medicinal plants. The NCS recognizes the fact that medicinal plants, an important part of the country's biological resources, have the potential to make a sustainable economic contribution to local communities. Medicinal plants are widely harvested for use by a large segment of the Nepalese population that continues to rely upon traditional systems of medicine, as well as for a growing export market. Medicinal plants and other alternative forest products, if harvested under proper management and control, can contribute significantly to the local, as well as the national, economy.

The USAID mission's support to the NCS process provided a catalyst to efforts to engender donor coordination in the area of biodiversity conservation. Because of the successful support to IUCN's NCS effort, USAID made the decision to continue broader support to IUCN through a more flexible grant. Along these lines a Biodiversity Working Group was initiated.

4. EVALUATION FINDINGS: PROGRAM IMPACT

Impact on Practices

Community development and alternative livelihood activities have been initiated but adoption rates remain insufficient to have a major impact.

The major threats of fuelwood gathering, grazing, and poaching have all seen a response in terms of changed behavior. Poaching has lessened except for a brief relapse immediately following democraticratisation. Through KMTNC's outreach program, six plantations totalling about 172 hectares have been established with the support from various donor agencies, including most notably USAID. Benefits from these plantations, although limited thus far, include the following:

- Regular hay and fodder supply reduces collection time
- Reduction of illegal entry into the park
- Less time for collecting fodder
- Community owns resources
- Lessened risk of injury by wild animal attack
- Wise use of highly degraded land
- Environmental Protection
- Soil erosion control
- Bio-diversity conservation
- New habitat for wildlife
- Local development by selling forest product from plantations
- Buffer Zone for RCNP

Tourism has greatly increased park revenue, and has had a broadly positive impact despite institutional conflicts in its regulation.

Nature tourism is the major contributor to park revenue, with its various activities contributing about 4 million NRs in 1991-1992 (See Figure 3). About 72 percent of this revenue came from entry and camping fees, with elephant rentals contributing 16 percent. Royalties from concessions made up 5 percent, while fines from park violators made up 1 percent. Various other fees, including those from river ferries, canoeing fees, grass cutting fees and miscellaneous sources contributed the remaining 6 percent (See Figure 4).

Some fifty eight thousand tourists visited RCNP during the 1992-1993 season. The numbers of visiting tourists have shown a steady increase over the last five years (See Figure 5). During the 1988 season, for example, thirty six thousand tourists visited the

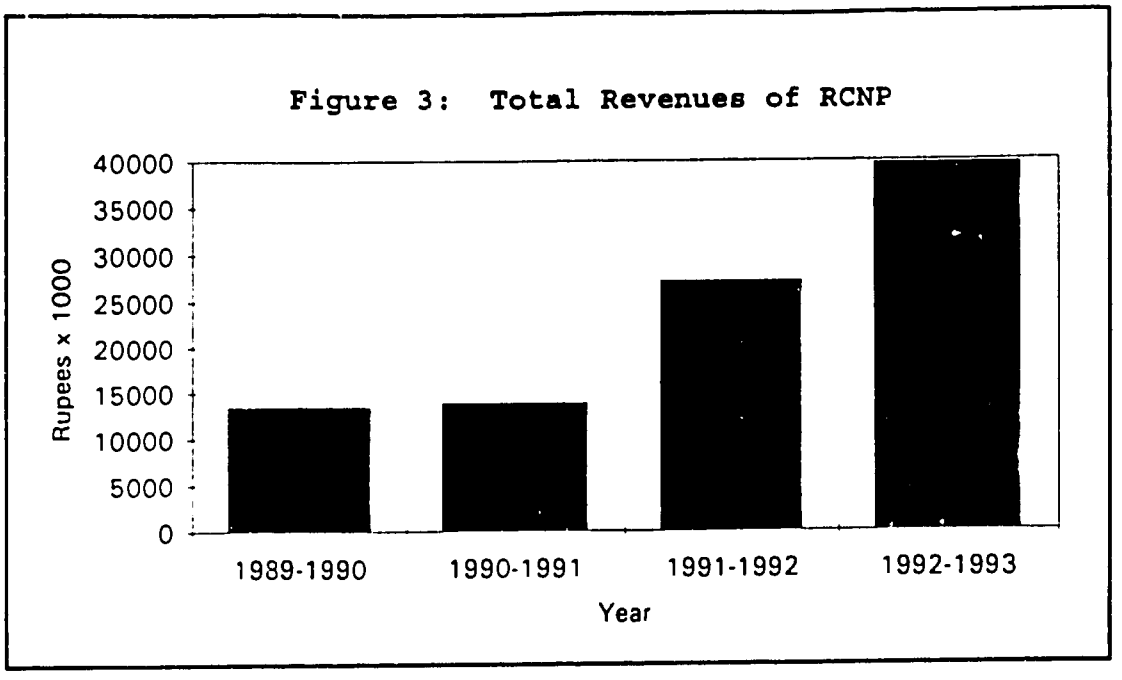


Figure 3: Total Revenues of RCNP
40000
35000
30000
25000
20000
15000
10000
5000
0
Rupees x 1000
1989-1990
1990-1991
1991-1992
1992-1993
Year

Figure 4: Sources of Park Revenue as Percentage of Total

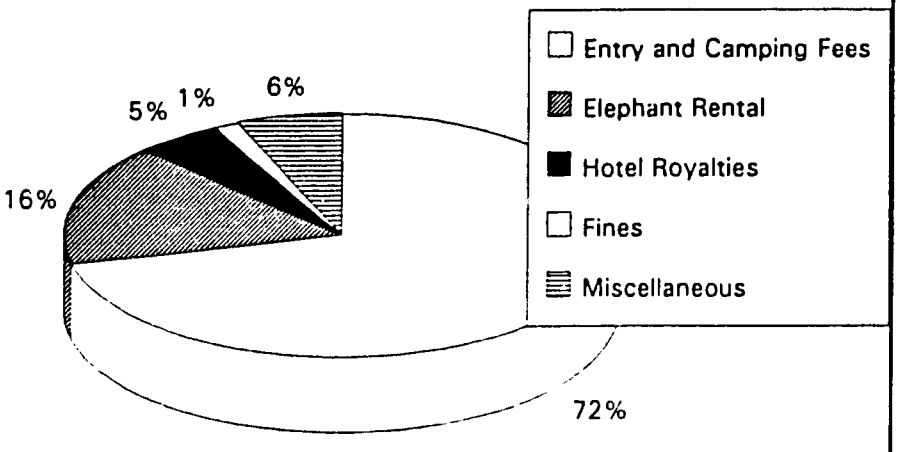
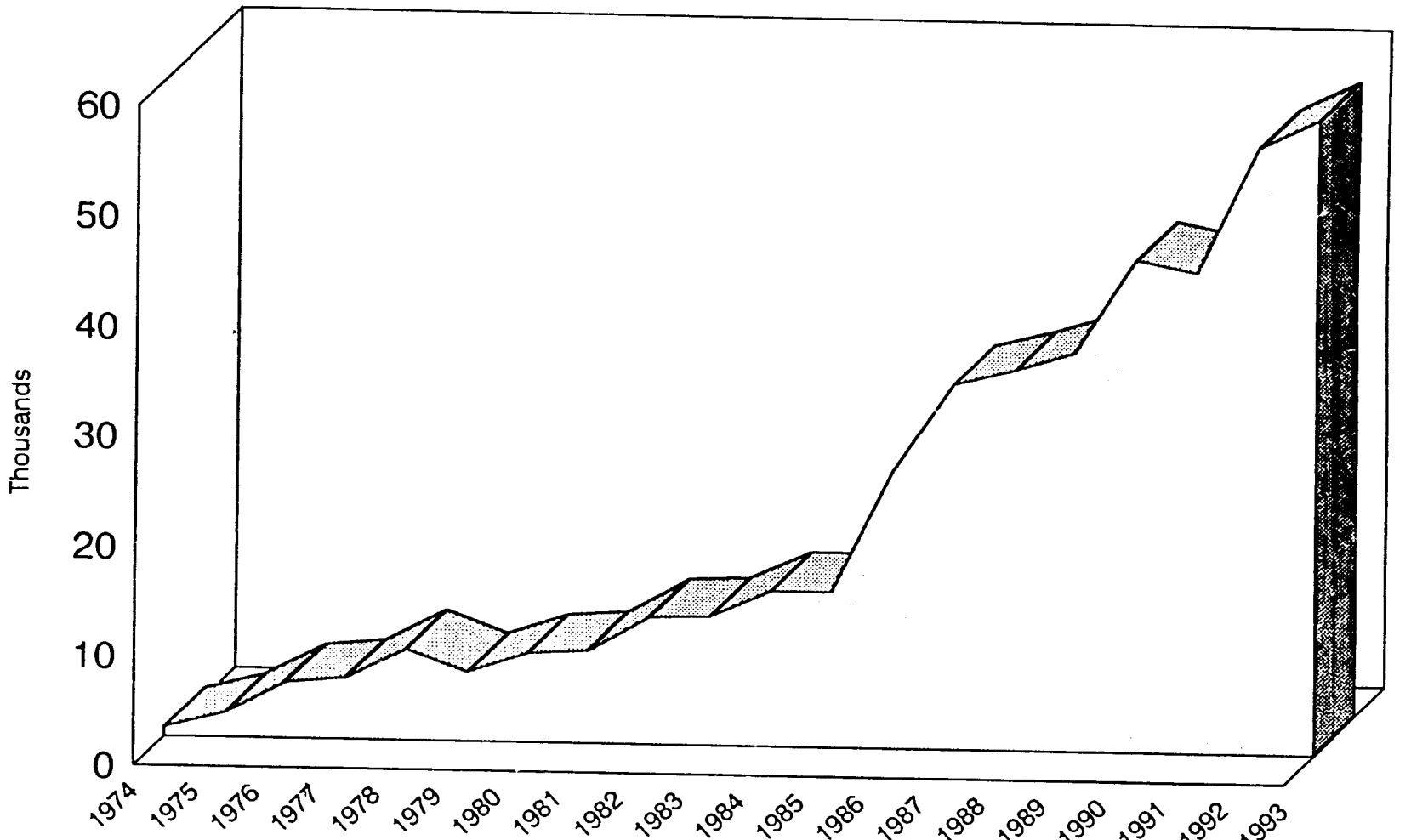


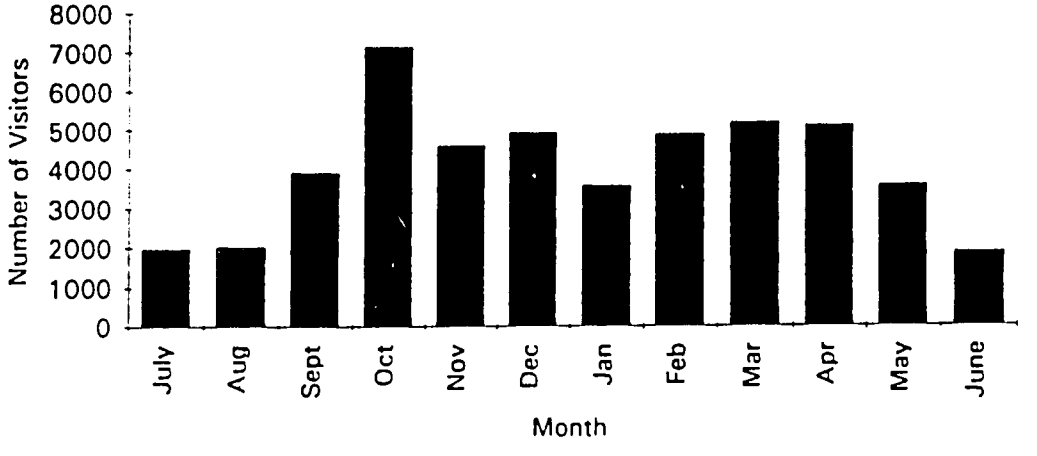
FIGURE 5

ANNUAL VISITORS TO THE RCNP



Source: RCNP, Kasara, 1993 (1990-1993 are July to June)

Figure 6: Average Number of Visitors to RNCP by Month (1989-1993)



park. There is a dramatic seasonal variation in the number of visitors, with the peak in October (See Figure 6).

While the negative environmental impacts associated with tourists have not been quantified in most areas, their effects were visible in Chitwan. Controlling tourist flows does not fall within the purview of the DNPWC, but is rather a function of the Department of Immigration. Cooperation with the Ministry of Tourism has not been productive because of conflicting institutional interests. Tourism is geared to maximize revenues and respond to private operators' interests, while DNPWC is mandated to insure that tourism promotion remains secondary to conservation interests. The failure to date of "green" tourism despite regulatory changes and conservation education programs is symptomatic of the lack of coherent institutional commitment. Prior to the BZMA, the Park Service had no mandate to work outside the park to integrate tourist facilities into the overall planning process. Even with the amendment many issues of institutional responsibility remain unclear (See Appendix D).

USAID support through the Kathmandu Environmental Education Project (KEEP) for the distribution of environmental literature at the Kathmandu International Airport and other areas where tourists gather (e.g. near the trekking permit office in Kathmandu) has undoubtedly played a role in improving tourist behavior, but it was not possible for the evaluation team to differentiate the degree of the USAID contribution. While the team was in the Chitwan area, a group of German KMTNC chapter members visited the park and the buffer zone community development activities supported by the Trust. In part, their intent was to increase environmentally and culturally sensitive park use by visitors.

In Royal Chitwan National Park, park staff, guides and hotel owners view tourists as acting responsibly toward the park's ecology. While the indirect effects of their presence are substantial (fuelwood for hotels, use of elephants), tourists seem both aware and respectful of the park, its wildlife and its plants. Their most common infringement is being in the park without a permit, and this is exceptionally rare. Tourists are almost never cited for direct damage to trees, plants, or for harassment of wildlife. This has been attributed to the high level of environmental awareness on the park of western tourists in general. However, specific sensitivities to the fragile ecology of Nepal have been heightened by tourist education programs at the major tourist gateways into the country.

Local employment and economic opportunities have changed some practices. Park staff actively foster an appreciation for the indigenous Tharu culture of the area. The King Mahendra Trust for Nature Conservation frequently sponsors Tharu "stick dances" for tourists and researchers. This, in turn, engenders great pride in the Tharu people and has helped to forge a link of mutual respect

among park authorities, visitors, the local people and even soldiers, who sometimes attend these events. Tourists first and foremost are consumers and thus regard Chitwan as a site for their adventure experience. In some cases, visitors can pressure local tourist services to better respond to an anticipated respect for nature and local ecology. Through its foreign chapters, KMTNC has been involved in raising awareness of some visitors before the visit the park. It also solicits contributions to support the development of low impact tourism.

Despite education and awareness programs for tourists and lodge owners disturbances to the ecology associated with the tourist trade have become obvious features of RCNP.

These disturbances are localized and take place within an overall context of successful protection. Both inside RCNP and in surrounding state forests, forest clearing for infrastructure, profuse firewood use for heating and cooking, and timber exploitation for construction have damaged neighboring forests. The heavy use of elephants by tourists and the trails made for nature walks have damaged the vegetation in many areas of the park. Fodder collection for elephants also has damaged certain forest areas. Were the collection of this fodder distributed throughout the park the impact would be minimal. But its concentration has denuded many trees. These areas have become what managers term "sacrifice areas." The question arises, are they too extensive or are there too many of them? The answer appears to be not yet, but better practices will be needed to keep this damage in check. The risks are of course compounded by the interaction of tourism with other environmental disturbances.

Wild animals have been disturbed by tourist activities. They have also been intentionally harassed so that tourists might view them better, either from elephants, from vehicles or on foot. Animal sightings from the road are becoming more difficult. Insects, butterflies and moths are directly exploited by tourist collectors, and in the process, rare and endangered species have been affected.

Outside the park, hotels use firewood and timber smuggled for sale by local people. This increased demand for wood from tourism has been significant. At concessions within the park, the kitchens and fireplaces use about 200 kg a day. Each of the 7 elephant camps also uses about 200 kg a day. This amounts to a daily use of about 3300 kg daily. During the three off-months, the use is approximately half that. While some concessions supplement their energy needs with solar hot water, others, such as Temple Tiger, rely solely upon wood. The clearing of land for the concessions has also reduced available habitat for the park's wildlife. The average land occupied by hotels and camps is about 5 ha per unit, with the total land impacted by hotels and camps about 45 ha.

The 40 hotels around the park each uses about 50 kg of firewood a day, or a total daily amount of about 2000 kg. Some of the hotels also use grass for cooking. The impact of the accommodations outside the park are diverse. Some discharge latrine and toilet wastes directly into the river. In Sauraha, plastic bottles, plastic bags and paper are scattered about the town.

Park management recently has begun to reflect the trend toward trying to bring local communities into the conservation equation.

Initial attempts to control poaching within the park consisted of imposing an "outside" authority in the form of the Royal Nepalese Army. Because of lack of resources, even the staff of the Department of National Parks and Wildlife Conservation played a minor role in these efforts. For the most part, local communities were totally excluded. Such force may have been useful as an initial deterrent against poachers and in establishing the fact and boundaries of the park. Now, however, the Army has become less effective. CDIE's mini-survey of lodge owners indicated that patrols had become predictable.

In the early 1990s, special "anti-poaching" units were formed. These "units" park rangers, members of the military, as well as paid informants from villages who provide intelligence on the activities of poachers. Integrating the various levels of authority and offering paid village participation has proven highly effective. Concessionnaires within the park and the Hotel Owners Association of Sauroha have begun to work with park management and the patrols, and are willing to help pay rewards to informants.

The contributions that villagers have made has begun to influence the balance of authority over the park. Whereas the army traditionally saw its role purely as an enforcer of laws, it has now begun to recognize that its relationship with the surrounding communities is vital to its success. Through their participation in anti-poaching units where they provide armed protection, soldiers are beginning to realize their potential for evolving constructive relationships with local villagers. This changing attitude is perhaps as important as the anti-poaching units themselves in the ultimate success of protecting the park. In an interview with CDIE, the military commander already referred to the army's presence as "transitional."

Similarly, park staff is making a more concerted effort to acknowledge the interests of local communities around the park. Grass-cutting season in an indication of this. After the devastating floods of last year, park staff has been given discretion to turn a blind eye toward wood collection and grazing in the park for members of the hardest hit communities. While it is generally recognized that such arbitrary overlooking of the law may not be workable in the long run, numerous villagers have

expressed gratitude that their interests are at least being acknowledged. The challenge is to fully integrate such flexibility so that self-policing not only becomes the norm but becomes the law.

Biophysical Impacts

Populations of the endangered greater one-horned rhinoceros (*Rhinoceros unicornis*) have stabilized and increased as a result of better park management practices.

While the drastic decline in the number of rhinos in Nepal over the last two hundred years is well documented, exact figures on the historical abundance vary. Between 1950 and 1968, for example, the population is estimated to have decreased about 88%. Under the protection of RCNP and its management practices, the population has rebounded vigorously. The population around Sauraha in 1975 contained 176 individuals. During the subsequent 13 years it increased by almost 50 percent. The population in the west part of the park increased by about 22 percent during the same period.

According to Dinerstein (Dinerstein and Price, 1991), by 1988 only two populations in the world contained more than 80 individuals. One was in India and the other was in RCNP. The latter is among the few populations that has increased over the past decade. Indeed, by 1988 an estimated 358 individuals lived within RCNP. "We predict that the Royal Chitwan National Park population will continue to increase by at least another 100 individuals to a population size exceeding 500 by the year 2001," the authors concluded.

Degradation of most forest habitat and its conversion to agricultural land has ceased within the park.

While peripheral settlements continue to increase pressure and degrade some habitat immediately within park boundaries, large scale conversion of park land to cultivation has ceased (Nepal and Weber 1993).

The exception to this no-net-loss to agriculture is through encroachment along park perimeters where no visible demarcation (such as fences) dissuades farmers from expanding, almost imperceptibly into park lands. This is the case, for example, along the eastern edge of Padampur. Sometimes this encroachment is done at night and may actually involve the planting of banana trees to create the appearance of a legitimate park border. Despite this, the park has been largely successful at holding ground against the expanding needs for increased cropland by local communities.

Succession toward climax is taking place on abandoned farmland within park boundaries, especially within grassland areas.

In the early 1960s, a high level commission resettled people from within the present day boundaries of RCNP. Some 4600 families, or more than 20,000 people, were relocated. The lands occupied by these former agricultural settlements are now part of the 20 percent of the park that is presently covered by grassland.

Depending upon the elevation and frequency of flooding, these former agricultural settlements have rapidly been recolonized by some of the 70 species of grass in the park. *Imperata cylindrica* (Khar), a short grass used for thatching, now flourishes on the ground that was previously farmed. This species was cut and burned regularly to provide building materials and grazing for stock, until the occupants were resettled. Where the khar is still regularly harvested during the grass-cutting period, it continues to dominate. Elsewhere, the taller and more aggressive *Saccharum* species have begun to take over. The decline of imperata and recolonization of the *Saccharum* in many formerly cultivated areas suggests that a natural succession is once again occurring within the boundaries of the park. In many areas, recolonization with the tall grasses has created prime habitat for the tiger and other wildlife.

In the absence of adequate buffer zones, increased development of agriculture and fuelwood harvesting has degraded certain areas within the park.

Despite the general trend toward stabilization of the park's vegetation, much of the area immediately within the park boundaries has suffered the effects of firewood, timber and grass collection and grazing. The impact ranges from a mild disturbance of the habitat and wildlife and thinning of the understory to a almost complete denuding of ground vegetation and the establishment of grazing forests. Naturally, the greatest impact is in areas of the highest concentration of people. The effects are therefore much more noticeable along many northern areas of the park than along the southern fringes.

About 95 percent of the land-owning families around the park also own cattle. The closer the families are to the park, the more cattle they tend to own--evidence suggesting that the park is providing the fodder and grazing land to support the larger herds. A 1976 study showed that one village at the park border was supporting a livestock biomass of 41,764 kg per square kilometer, whereas a village six kilometers away supported only 27,895 kilograms per square kilometer, or 33 percent less. (Seidenstick 1976). This difference in biomass is almost certainly supported from fodder and grasses within the park.

There are five main forest items that local people take from the park: fodder, firewood, thatch, reed, and timber. Fodder, firewood and timber are taken throughout the year, but mainly during winter. Although only fodder, thatch and reed collecting was legal during the grass cutting season, people smuggle out firewood and

small logs at any time, hiding them in the grass loads. Later, these logs are sawn in the backyard to produce building materials, furniture or agricultural tools. Near the park, each household extracts from 26 to 50 loads of firewood a year, 40 loads of fodder and between 60 and 70 loads of grasses, according the Park Warden.

The magnitude of this collection has caused a gradual deterioration of the forested buffer areas and areas immediately within the borders of many parks. The canopy often shows unnatural gaps. The wildlife habitat has been disturbed, and the integrity of the park is threatened. Because of grazing, some areas within the park have experienced a downward succession of vegetation changes. In a few areas, most of the undergrowth has been removed and the land actually cleared of trees. These distrubances, while many and troubling,

Socioeconomic Impacts

Populations from as distant as 50 km (or more) profit from the practice of allowing controlled harvesting of *Sacchrum* and *Imperata* grasses for short periods during the year.

The RCNP issued 65,254 grass cutting permits in 1993. Grass cutting is commonly stated as the local people's favorite reason for having the park nearby. However, it has been estimated that out of fifteen days allowed each permit is used only for ten days for grass cutting purposes. The remaining days are used for illicit firewood collection. Indeed, surveys have shown that the a second major benefit of the park is the stealing of wood during the grass cutting seasons. Thatch grass "khar" (*Imperata cylindrica*) is the main type they collect, followed by reed or "Khadai" (*Saccharum species*). Also collected is *simti* (*Helictrus isora*) and *babiyo* (*Eulaliopsis binata*) for rope making.

Each permit-holder brings an estimated 2 loads of thatch grass or reed each day for 10 days. On average, one load contains 20 bundles of grasses. Therefore, 400 bundles total are collected. The local price per bundle of thatch grass as well as reed was about NRs 3.5 in 1993 in Chitwan. Thus, the value of grass collected from one permit has been estimated NRs 1400 (400 bundles X 3.5). The total value of grass estimated is 1400 x 65,254 or NRs 91,355,600. Lehmkuhl et al (1987) calculated that each bundle weights about 2.8 kg. Therefore, total weight of grass taken from RCNP is about 73,084,480 kg or 73084.5 metric tons. The prevalent labor cost in 1993 was NRs 50 per day. The labor cost for 10 days comes NRs 500 per permit. Therefore, the total labor costs is 500 x 65254 = NRs 32,627,000. Not only then does the park generate a usable or saleable commodity, but it provides the equivalent of some 2,000 man-years of employment annually.

At a permit cost of NRs 5 revenues of NRs 326,270 are generated. Subtraction of those permit costs and labor costs from the value of the grass yields a net value of NRs 58,402,330. When compared with total annual park revenues of around forty million rupees, this figure is remarkable and indicates scope for cutting fee increases. The new legislation, furthermore, will direct 30 to 50 percent of these revenues to local communities, making the possibility of such an increase more compatible.

Tourism has generally had a positive impact upon concentrated segments within the local communities.

Tourism has made an immense contribution to the welfare of many local peoples, although the effect has been concentrated in and around tourist centers, especially Sauraha. About 1000 people have gained direct employment in hotels at Sauraha, while another 500 are employed are guides, laborers, Tharu dancers, restaurant employees and shopkeepers. The seven concessions within the park also are a source of employment for local communities outside the park, without about 635 employees in 1993. (Table 2 reveals a discrepancy of 92 between reported and actual numbers). The multiplier effects of this employment and of other tourist expenditures can only be hinted at. Isolated questioning within villages surrounding the park underscored the unequal distribution of these benefits.

The forced relocation of several villages from inside the proposed park area generated considerable local hostility and mistrust.

Considerable antagonism has long existed between the park and local people, particularly residents of Padampur VDC. The main areas of conflict are loss of life (3-5 people are killed annually by rhinoceros and tigers), loss of livestock (domestic cattle may constitute up to 30 percent of tiger kills in settled areas peripheral to the park), damage to crops (estimated to range from 10 to 100 percent) and restrictions concerning the use of the park's resources (hunting, fishing, grazing, and collection of timber, fuelwood and other forest products for food and medicine are prohibited within the park). Overgrazing along Padampur riverain boundary is seriously accelerating the already extensive erosion of the river bank: consequently valuable crop lands are being lost. Sixteen people were killed by tigers in and around the park between October 1980 and early 1989 (Nepal and Weber 1993). Such conflicts will escalate as the local human population continues to increase and remnant forest and grassland areas outside the protected areas complex decline.

Table 2: Concession Lodges and Hotels Inside RCNP

Name	Employees	Elephants	Vehicles	Canoes	Beds	Beds in Tented Camps
Machan Wildlife Camp	93	7	6	6	48	26
Chitwan Jungle Lodge	73	8	5	4	64	
Gainda Wildlife Camp	111	7	6	6	25	28
Narayani Safari Lodge	42	7	3	2	32	
Tiger Tops Jungle Lodge	161	15	12	7	60	20
Island Jungle Resort	35	4	4	6	40	
Temple Tiger Jungle Lodge	27	6	3	4	40	

5. EVALUATION FINDINGS: PROGRAM PERFORMANCE

Program Efficiency

CDIE did not attempt a valuation study of the park and its resources, but between park revenues, tourism's economic impact, and grass cutting alone, the benefits to having established the park versus having the land under cultivation unquestionably weigh in favor of the park. Even with the 70-80 percent of the park budget which goes to the military considered as a program cost, revenues surpass expenditures. Bringing program costs down increases efficiency. One major indicator of efficiency is the relative cost of controlling poaching under the authoritarian, conservationist model versus a participatory approach. CDIE's data do not permit a full analysis of this indicator. However, preliminary observations provide appear to support the participatory approach from an efficiency standpoint.

Park authorities have traditionally relied on the assistance of the Royal Nepalese Army to enforce protected area regulations, and this has apparently reduced poaching in some areas. Beyond the administrative difficulties in determining who has overall authority for a given park, army involvement is costly. Already about seventy-five percent of the DNPWC's total budget passes directly to the military. Troops under military command are given almost no specialized training that would allow them to better perform their non-military role. Moreover, their jurisdiction is strictly limited to the area within park boundaries, and this does not correspond to the sphere of action of poachers.

In contrast, the RCNP administration is experimenting with "anti-poaching units" and local awards coupled with rewards to informants. The results have been impressive so far. The cost of the anti-poaching units is marginal. The units are composed of senior and junior game scouts, sometimes enlisted soldiers who already draw GON salaries, and local villagers whose compensation is minimal. Working in conjunction with informants, at least ten incidents of poaching were prevented in the six months prior to the evaluation team's visit.

Rewarding informants alone produced impressive results; 75 poachers were jailed in the previous three years. Rewards varied but the sum of NRs. 2,500 ($50) was offered by one informant as being typical. Given the current price for rhino horn and tiger bones of around NRs. 50,000 per kilogram, the anti-poaching unit holds tremendous economic potential not only to protect valuable and endangered species but also to reduce the onerous costs and controversial presence of the army.

Another measure of efficiency is the value of the results of the research funded in terms of the returns in the form of improved management. Clearly, there is a value to the increase of over 300 rhinos in the park since the research and mangement activities were undertaken. According to the former Smithsonian Tiger Ecology Project, the value of the research is much more than the weight of the ensuing publications. Overall, the program costs of establishing parks, because of their contribution to conserving biodiversity, are under present priorities considered strategically important. Their efficiency is secondary, but better approaches to park valuation, now being developed and applied elsewhere will certainly bear on the situation in Chitwan in the not too distant future.

Program Effectiveness

Tourist revenues have brought benefits to a segment of the population around RCNP and promises to bring a more equitable distribution through the revenue sharing legislation now being put into effect.

Adoption of environmental and culturally sensitive principles for tourism, while imperfectly applied, have permitted an expansion of park revenues which under new policies will bring direct benefits to the populations surrounding the park.

An outstanding amendment in the Act is the provision of park revenue sharing from 30 to 50 percent with local people for the community development work and small activities (See Appendices F and G). This is envisaged to contribute significantly people's support for conservation. USAID support encouraged policy dialogue that was instrumental in the passage of this historic revenue-sharing legislation. NGO partners had also been involved.

Despite measures to involve local populations, they still see park protection in antagonistic terms.

Initial tensions from the forced relocations at the time of RCNPs creation were exacerbated by subsequent prohibitions on grazing and collection of forest products, and because of human injury and death as well as crop and livestock loss from large mammals protected in the park.

Enforcement is strict. In 1985, for example, 554 people were fined and 1,306 livestock impounded. By 1993 6,000 people were arrested in the park for illegal fodder and fuelwood collection and fined a total of 363,102 NRs. That same year, almost 9,000 cattle found illegally within the park were impounded, with 176,720 NRs fines levied (See Table 3).

There are contrasting indications that local people have begun to appreciate the value of the park for managed natural resources. In particular, a long history of flooding of the Rapti River, which

Table 3: Illegal Collection of Fodder and Firewood in RCNP

Illegal Fodder and Fuelwood Collection			Illegal Grazing		
Year	Persons Arrested	Fines (NRs)	Year	Number of Cattle	Fines (NRs)
1990	2938	176925	1990	5250	105000
1991	3657	220207	1991	8765	175300
1992	3935	239731	1992	10749	214980
1993	6001	363103	1993	8836	176720

defines the northern boundary of park, has convinced people of the value of forests. Several residents of Padumpur village attributed the flooding and deposition of alluvial sands atop fertile floodplain soils to increased upstream clearing. In another village, floodplains outside the park had been given protection to encourage regeneration of perennial grasses. However, until a wider spectrum of actors work together to better control illegal collection of fuelwood, poaching, and cattle grazing, the program's effectiveness will be limited.

Program Sustainability

Capture of tourist revenues offers a vehicle for developing financial and institutional sustainability.

The 1993 amendment to the Wildlife Conservation Act provides for the distribution of from 30 to 50 percent of park and protected area revenues to surrounding communities. The new 30/50 legislation builds upon a growing tendency for Nepal to devise park management models whose sustainability depend on increased local participation. The new national policy grows out of the park management experiences of the last ten years. USAID support has certainly contributed to the establishment of the policy and practices surrounding benefit sharing in conjunction with conservation support. Because the impact of training, policy dialogue, and small grant support is difficult to trace, the question of attribution becomes secondary.

KMTNC has developed internal fund raising capacity and has also been accorded means of capturing a portion of the tourist revenues channelled through the government. Sixty percent of trekking permit fees are passed directly to ACAP management for rural community development programs. Villages are organizing and actively soliciting ACAP involvement in their communities. While an important motivation appears to be for communal and private sector benefits, the link to conservation activity is evident. Although this funding model has been especially effective in the Annapurna Conservation Area Project, it holds promise for other parks as well.

Program Replicability

Conservation education results have been promising enough for the model to be replicated more widely in the country.

USAID funding of ECCA through the IUCN grant helped develop an efficient model of conservation training. Based upon the success of early conservation training camps, subsequent training was held in two other villages in Nepal. Conservation training courses were also funded by Action Aid, REDD BARNA, WWF/MacArthur Foundation USA and CECI/SAP Canada. In the first six months of 1993, 13 ECCA

camps were implemented in eight districts of Nepal. While only limited areas were reached through these pilot initiatives, the strategy itself proved highly effective.

The Chitwan case established the value of basing park planning and management on the results of scientific research.

A solid scientific foundation for park management and species conservation programs grew out of early and detailed research programs. Concessionaires such as Tiger Tops Lodge, donor financed efforts including the Terai Ecology Project complemented one another and both fed into management decisions made by the Chief Warden.

Research success does not lead to self-financing, but it does attract attention and makes subsequent fund-raising easier. The early research on the ecology of rhinos in the RCNP area helped set a precedent for managing endangered species of Nepal in a scientifically sound manner, with decisions guided by the dynamics of individual populations and sound baseline data. It also showed the necessity of understanding population and behavioral dynamics of animals confined to a limited area. In short, the research process has become replicable (facilities, trained core staff, and fund raising capacity) within the emerging park model that Chitwan represents. Recognizing the contribution of the KMTNC to this model, the park services have recommitted themselves to the NCTRC and are organizing training sessions there for staff from the country's other parks.

Management practices derived from USAID funded research have permitted replication of strategies to increase rhino populations in Terai's remaining natural habitat. Between 1986 and 1991, 38 rhinoceros were translocated to Royal Bardia National Park from Royal Chitwan National Park. The main aim of this translocation program was to create another viable population of rhinoceros in the similar habitat. Follow on studies of the animals released in 1986 reveal that of the 13 released or 5 translocated males, 2 of the 5 translocated males died of natural causes, one was poached and one is still in India. Of 8 females translocated, one died by natural cause and one is still in India with her cub. One adult male and one adult female were not located during the study period 1990/92.

Of 25 re-introduced rhinos in Babai Valley section of RBNP, two (one adult male and one adult female) have been poached. One newly borne calf was found dead. The cause of death may be drowning while he was crossing the Babai river and trapped into the stone. Thus, based on the previous year's data and recent observations it can be said that there are 23 adult and 4 new calves in the Babai Valley.

Similar principles were later applied to studies of the tiger in the region. With tiger studies came an actual infrastructure for ecological research in the form of a research station and equipment. With a firm foundation of successful research into these two high profile species, later studies began to address lesser known endangered species of RCNP such as the muggar, ghariel, sloth bear and other species. In short, the momentum of early work supported by USAID influenced both the direction and quality of later work. In the end, the precedents set by successful early research helped RCNP to become one of most thoroughly studied and best understood parks in all of Asia.

Benefit and revenue sharing from opening the park to limited grass harvesting offered an example that is being replicated elsewhere.

Controlled grass cutting in RCNP embodies the concept of integrated conservation and development, balancing protection and the subsistence requirements of the local people. The experimental initiative demonstrated both the benefits and the perils of such programs. While the specifics of such controlled use (grass collection, wood collection or the limited harvesting of animals) may change, the dynamics of peoples' interaction with a protected area has common threads. Thus, grass collection in RCNP serves as a valuable model for the interactions of local people in other protected areas of Nepal. Similar programs of "limited use" are being tested in the Annapurna Conservation Area as well as in Makalu-Barun.

6. LESSONS LEARNED

Strict protectionist measures are ineffective in conserving a biologically rich area upon which local peoples are dependent.

The issue is not usually strict protectionism but, rather, of who is allowed to use the park for what purposes. In Chitwan villagers are not so resentful of the army per se as they are of others who have such easy access to the park. In particular, they see the army as enforcers of this inequality. In the view of many villagers, certain "outsiders" are encouraged to exploit the park. In the villagers' view, the root of the problem is not protection of the park but of preventing villagers from getting their fair share. Protectionism, then, is but one symptom in an imbalance in the representation of stakeholder interests, and is one reason that Chitwan was characterized as an evolutionary model of park management.

On this point Chitwan resembles many of the protected areas throughout the developing world and in some cases those of the developed countries. Of interest is the need to balance regulatory support with user based governance. The embodiment of these two seemingly contradictory tendencies in the *same amendment* to The National Wildlife Act -- revenue sharing via the 30/50 provisions on the one hand, coupled with stiffer sanctions for violations of park regulations on the other -- underscores the continuing need for both. DNPWC recognized the need to simultaneously strengthen sanctions against poaching even as new provisions in parks legislation facilitate local participation and benefit sharing. Where valuable resources are at stake, access to benefits must be offset by adequate sanctions against abuses. The evaluation evidence suggests that enforcement authority functions most effectively when situated closest to the users responsible for the violations.

Furthering biodiversity conservation requires that USAID programs increase their understanding of the status and management requirements of endangered species outside of RCNP (and other protected areas).

Various USAID funded research has pointed to the interrelations between habitat inside the park, outside the park and species survival, Protected areas conserve areas of rich, unique and vulnerable species. Such "hotspots" are singled out for protection because of their special attributes and requirements. In the case of RCNP, this role has largely been met. Without it, today there would almost certainly be no rhinos or tigers in all of Nepal, not to mention an array of other species that depend on the park. Parks and protected areas such as RCNP provide important stones in the gateway leading to the preservation of Nepal's biological diversity,

but alone they are insufficient.

As the National Conservation Strategy suggests, it is insufficient to conserve plant and animal species only within protected areas. Even though areas of prime biological diversity may fall within protected areas, the economic well-being of the majority of Nepal's people depends upon exdtending protection of species and habitat beyond park and protected area boundaries. This is especially true in areas where poaching is common and where livestock compete for habitat.

Outside of protected areas, forests have received considerable attention, while rangelands, for example, remain understudied. The grasslands, shrublands and forest grazing lands play an important role in the country's agricultural production systems; provide vital wildlife habitat; serve important watershed management purposes; and are becoming increasingly important recreational areas. Grasslands alone cover an estimated 12 percent of the total land area of Nepal. Despite the extent and importance of the country's rangelands, in comparison to forests or protected areas, they tend to be an overlooked biological resource. Detailed biological assessments of rangeland resources in northern Nepal have not been undertaken and there is a lack of quantitative and qualitative data upon which to base management decisions.

However, within a general strategy to conserve the country's biological diversity, protected areas play vital, specific roles that can benefit less protected areas. Protected areas also serve as experiments on conversation strategies that can be performed only under relatively controlled conditions. Without the lessons learned from RCNP, the protection of biological diversity in many less protected areas of Nepal would be far less effective. For example, the lessons of RCNP have played a pivotal role in increasing awareness of the need to protect forests around the park.

Many of the issues concerning human conflict with the park's wildlife remain unresolved. There is no system of mitigating the impact of rhinos or deer on crops, or any system of compensation for farmers. There is also the killing of livestock and poultry by tigers and leopards. In retaliation, local people sometimes poison tigers and leopards. Birds are also incidental victims of pesticides used on fields. At least eight rhinos were killed between August 1990 and March 1991. Three tigers have been poisoned since November 1990.

Umbrella grants to NGOs can be a highly effective means of funding biodiversity conservation initiatives.

. USAID funds to IUCN Nepal have resulted in a range of effective initiatives directed at biological conservation in the region of Royal Chitwan National Park. The KEEP and the ECCA projects were able to leverage start-up monies from USAID to establish multiple

funding sources thereby enabling them to expand upon their pilot efforts. Research grants mostly through the International Institute for the Environment and Development and WWF allowed critical research results to feed into management decisions. Even the intermittent and indirect support to NCTRC has ensured continuity of facilities and support staff for research projects that arisen.

Working from the policy level, funds strategically distributed to a local NGO played a pivotal role in the adoption of buffer zone legislation and revenue sharing in which local communities will receive a percentage of the income generated by the park. Lobbying efforts brought about through local NGOs, reflecting the views of people to whom the legislature is immediately accountable, proved more effective than pressure by international conservation organizations in preventing a habitat threatening dam from being constructed. Furthermore, such grants have the capacity to empower local participation in the democratic process, whereas international lobbying, which often by-passed local individuals, can serve to disempower community participation.

Strong in-country presence can enable USAID to support biodiversity conservation activities even when an explicit program focus is absent.

Biodiversity conservation is an important dimension in any equation for achieving sustainable development. As the Agency attempts to identify and target the most critical "hotspots" for its strategically directed programs, there is an inherent risk that biodiversity concerns may be omitted in those countries and missions not specifically targeted. Nepal provides an example of how a strong in-country presence was able to leverage small investments in manpower training, environmental policy and planning, research, and NGO support to play an important role in affecting the direction taken in the country's protected areas management program. The ongoing involvement of both foreign service nationals and U.S. direct hire and contract employees with technical skills in the natural resources management field were indispensable to a successful effort in Nepal. Combination of these same program and staffing elements, especially in USAID programs having an environment or natural resource strategic objective, would enhance the possibility for achieving similar results elsewhere.

Revenue sharing by allowing non-consumptive use of park resources, can be effective in gaining support of local peoples for conservation aims.

It may not always be possible to eliminate all human use of park resources. While the "replicability" of such programs awaits further investigation, the grass cutters of RCNP provided valuable lessons of relevance to managers of protected areas not only in Nepal, but around the globe.

Establishing the link between development benefits and more responsive conservation behavior of those receiving benefits presents a significant challenge to the assumptions of the convergent model where conservation and development are integrated.

The benefits accruing to villagers are substantial and immediately linked to the vitality of the park's ecosystem. These benefits appear in Chitwan to largely offset the combined interference with village production systems of wildlife predation and a sometimes excessively authoritarian administration.

7. OUTSTANDING ISSUES

While park use generates fees and benefits, can villagers', tourists' and other park users' behavior be swayed sufficiently to preserve biodiversity?

The continuing lack of uncontrolled exploitation of the park during the grass cutting seasons (15 days) threatens the integrity of the program. According to past surveys, when villagers were asked what they liked most about the park, they said cutting grass. When asked their second favorite reason, they said the stealing of wood during grass cutting season. This attitude sums up the problem of uncontrolled exploitation. While grass cutting has greatly enhanced villagers' appreciation of the park, it has also opened the way for increasing what they do all year round: pirate resources from inside the park, especially wood, grass and fodder for cattle.

At times in the past, such as after severe floods, park authorities have turned a blind eye toward the taking of wood during the grass cutting season. Even enforcement is ineffective. Small bundles of wood are often hidden inside the larger bundles of grass that the people carry out. While much of the wood is dead, some of it is acknowledged to be freshly cut. For certain animal and plant communities, dead wood is just as valuable as live. Therefore, from a biological perspective, it may be no less harmful to take branches from a fallen tree than from a live standing one. The park was open for one month of grass cutting. This sort of "vandalism" led authorities to later reduce this to two weeks.

The amount of grass and wood taken during the season has been documented, but unfortunately, exactly how this impacts the park remains largely unstudied. To the contrary, it is widely accepted that the collection of grasses, when controlled, can facilitate the growth of new grass and help maintain the grasslands. Most of the information about the harmful effects of uncontrolled collecting are observational but well-founded. The understory in certain areas appears obviously different after the grass cutting season, with much of the ground wood removed, vegetation trampled, and some evidence of lower branches having been removed from standing trees. In short, the habitat is being transformed, with the immediate affect of inhibiting certain wildlife from using familiar grounds and with longer terms effects in all likelihood influencing the succession of certain forest areas.

Rather than exploiting the park during grass cutting season for subsistence needs, many people now collect goods to sell on the market. This completely bypasses the authorities' original intentions in opening up the park at all. Some villagers have even begun collecting a type of grass that is sold to a paper factory not

far from the park.

Concerning tourists within and outside the park, the determination of acceptable tourist impact remains unclear. Tourist revenues have been shown to be an important contributor toward financial sustainability of Chitwan, and this is true for Nepal's parks in general. Environmental education programs directed toward modifying tourist behavior are promising but have had minimal impact on park conservation. Advocacy of ecologically sound tourism by hotel owner's is very uneven, although positive models were found. The future role of hotel concessions within the park remains unclear.

While it is evident that tourism has had both negative and positive effects, the environmental impact of hotels has not been completely assessed. Furthermore, there is an on-going conflict between the concessions within the park and the hoteliers outside. The outside hoteliers resent that they are not allowed to take elephants into the park, especially when elephant rentals account for a large percentage of the money that tourists spend. Secondly, the hoteliers see the concessions as having an unfair advantage in that most tourists who can afford it would naturally rather spend time within the park rather than outside of it.

APPENDIX A

EVALUATION METHODOLOGY

CDIE assessments of environmental programs are aimed at answering two central questions: "Has USAID made a difference?" and, if so "How well did it do it?" The central hypothesis of the environmental assessments is that USAID, through the right mix of program strategies, can impact on local conditions and practices to produce favorable long-lasting changes in the bio-physical environment and on the socio-economic welfare of cooperating countries. This Appendix describes the process used to test this hypothesis in USAID programs aimed at protecting biological diversity.

Impact - How much?

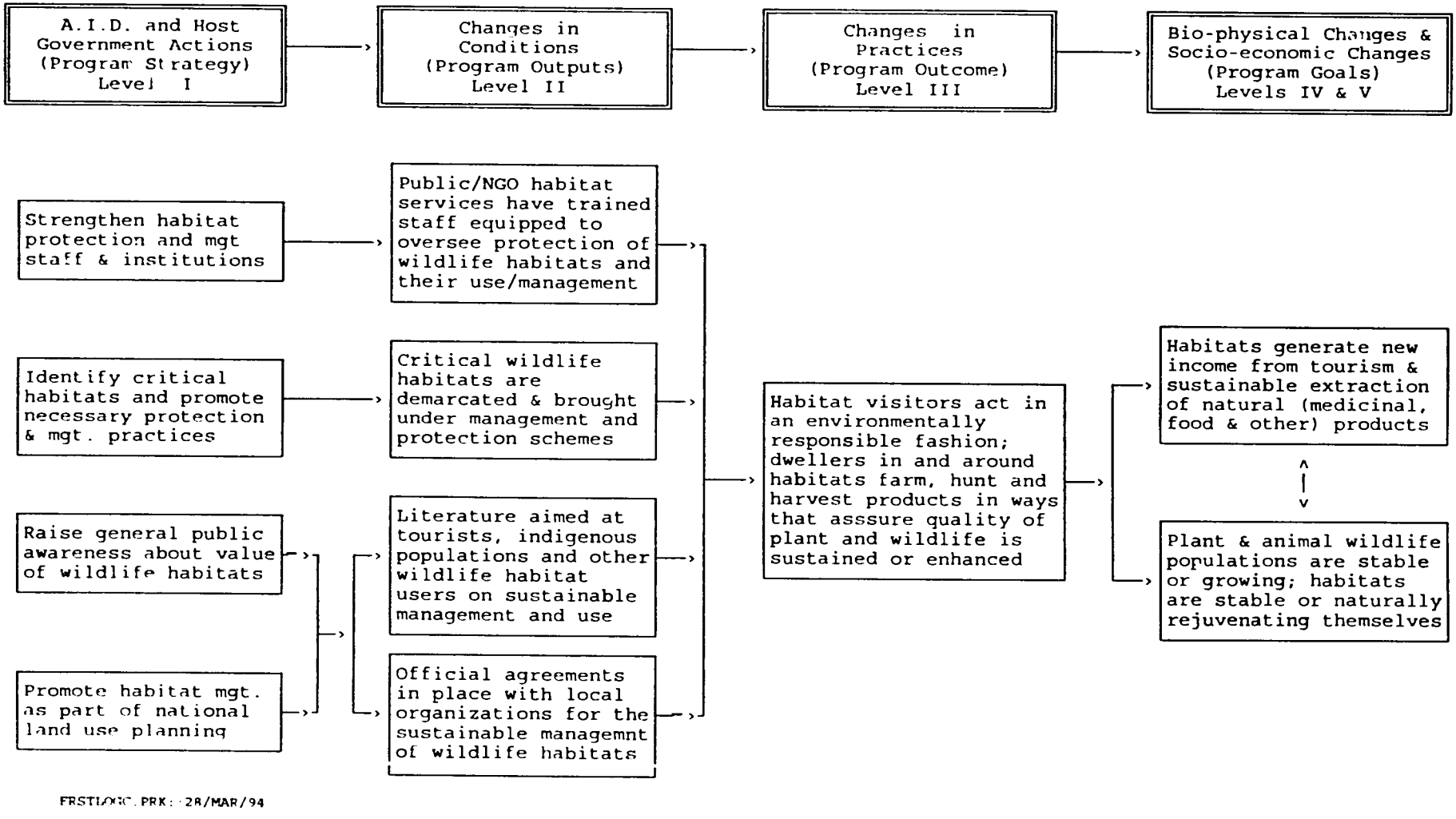
The assessment seeks to establish plausible associations between USAID program strategies or activities and the benefits to the human population which result from improved environmental quality and better natural resource management. In answering the first question, "Did USAID make a difference?", the assessment has attempted to document what happened or can be expected to happen from USAID assistance. The evaluation examines the relationships between environmental impact and USAID program investments using a five-level analytical framework (See Figure A-1.)

In the assessment framework, **Level I** describes the **"program strategies"** that USAID and the host government employed to conserve biological diversity through forest and marine habitat protection programs. These strategies include: strengthen habitat protection and management staff and institutions, identify critical habitats and promote necessary protection and management practices, raise general public awareness about value of wildlife habitats, and promote habitat management as part of a national land use planning.

The information is collected and organized in terms of four, cross-cutting strategies employed by USAID: 1) strengthening institutional capacity; 2) introducing technological change 3) fostering environmental education and awareness; and 4) adopting environmentally sound economic, regulatory, and tenure policies. The operating hypothesis is that by successfully carrying out development programs that create enabling conditions in these areas or by successfully recognizing and building on pre-existing conditions, meaningful progress toward the conservation of biological diversity will be made.

Figure A-1: Framework for Assessing USAID Bio-Diverisity Protection Programs

(Focus of Forest and Marine Wildlife Habitats)



At **Level II, "program outputs"** are the conditions that have resulted from implementing these strategies. Examples include: public agencies or NGOs services have trained staff equipped to oversee protection of wildlife habitats and their use/management,critical wildlife habitats are demarcated and brought under management and protection schemes, literature is published and disseminated to tourists, indigenous populations and other wildlife habitat users on sustainable management, or official agreements are in place with local organizations for the sustainable management of wildlife habitats.

The **Level III "program outcomes"** resulting from changes in Level II conditions are the adoption of practices and technologies by target groups. Such changes in practice include: habitat visitors conduct themselves in an environmentally responsible fashion, dwellers in and around habitats farm, hunt, and harvest products in ways that assure quality of plant and wildlife is sustained or enhanced.

Level IV and V "program goals" constitute the biophysical and socio-economic changes expected to result from the adoption of Level III program outcomes or practices. Level IV and Level V goals can be viewed as mutually supportive; each contributes to the sustainability of the other (and in many respects each flowing from the other.)

For the purposes of the evaluation, **Level IV "bio-physical goals"** are the specific environmental objectives of the program being assessed. Level IV indicators measure environmental conditions and biophysical changes that contribute to producing the strategic objective. Such changes would include: plant and animal wildlife populations are stable or growing, or habitats are stable or naturally rejuvenating themselves.

Level V "socio-economic goals" represent the development goals and are generally associated with sustainable increases in income, profits, remunerative employment, overall well-being, or production. While access to income data is difficult, the continued involvement of beneficiaries in the program can be used as a "vote with their feet" proxy indicators of improved farm incomes and profits, at least at the time of the evaluation.

Performance Scales: How well?

In answering the second question, "How well?", CDIE's primary concern is the **efficiency, effectiveness, sustainability** and **replicability** of the program.

Where data exist, the evaluation measures program **efficiency** by using monetary estimates of the flow of benefits to calculate an economic rate of return for those USAID and host government program

investments to which benefits can reasonably be attributed. Because benefits occur into the extended future, their value must be annualized and adjusted to net out all costs and expressed as a discounted net present value to compare with project investment.

To assess program **effectiveness**, the evaluation examines how well USAID sponsored techniques or services are reaching intended target groups and whether there is equity or bias in access and participation by these groups. Examples of effectiveness indicators include the make-up of participating groups according to resource endowments and social status (e.g., farm size, gender)

The examination of **sustainability** is important at all program levels (See Figure A-1). Evidence of sustainability includes the continuation of activities, regulations, or institutions beyond the termination of USAID technical and financial assistance either on their own "internal" momentum or with host government or other donor assistance. At the conditions level II indicators include how long NGO's have continued to operate independently of outside support or how successful local NGOs have been in obtaining outside funding support for their operations. At the practices Level II indicators include the economic viability of new enterprises introduced to dwellers around the perimeters of protected areas and the financial soundness of park management and protection programs. At the bio-physical Level IV indicators include evidence that native plant and animal populations are stable and growing, invader species of exotics are under control and that feeding and breeding grounds are remaining in or returning to their natural state.

To determine the **replicability** the evaluation examines whether conditions and practices, promoted by the program, have spontaneously spread beyond the target areas. This spread may occur among participants by "word of mouth" or other means without further outside support, or "induced" by public, private or donor agencies which have picked up on a USAID supported concept. Replicability indicators include the number of similar activities supported by local or international agencies outside the program target area and population; number of participants outside the target area that have adopted in sum or in part USAID sponsored practices.

Data collection procedures

CDIE employs a variety of primary and secondary sources of data to: construct the chain of events linking program activities and to impacts; examine major evaluation issues; and identify lessons learned.

In preparation for the field work CDIE collected and analyzed relevant secondary data and information that are available in Washington or in host countries from a range of sources including

project documents, technical reports, and special studies (available with the Agency's Development Information System).

CDIE's fieldwork methods combine an examination of changed and changing conditions at the national policy, planning and institutional levels with a more in-depth evaluation of one case where a site-specific protected area program has been operating with USAID support. Data collection methods included key informant, focus group and informal interviews, direct observation and analysis of secondary sources

Evaluation data collected in the field will form the basis for a country case study synthesizing lessons learned from USAID programs in fostering conservation of biological diversity through protection and management of protected forest and marine habitats. The case study experience will in turn contribute a global assessment of USAID biological diversity.

In addition to a review of program and project documentation (see bibliography of all documents cited in this assessment), data collection includes field visits to document implementation efforts. These include non-statistical evaluation of the biophysical state of habitats under improved management practices and a comparison of conditions in areas that have not experienced USAID supported interventions.

Following each field site visit, participating team members gather to discuss their findings. A structured checklist is applied to these discussions to ensure team consensus on key points related to program performance. In addition, the team develops a roster of key technical, institutional, social and economic indicators for evaluating program impact at each site. The team members use this roster to strengthen their consensus on the assessment of field site. The consensus building checklist and the key indicators lists are attached in the following pages.

Biodiversity Conservation Site Assessment Checklist

A. Institution building

1. Evidence of an increased ability by government personnel to implement biodiversity conservation.

2. Evidence of an ability by user groups to implement biodiversity conservation.

3. NGO's - Evidence of an increased ability by NGO's to assist in the implementation of biodiversity conservation.

B. Awareness, Education and Advocacy

1. Evidence of educational/awareness programs being carried out in the project areas.

2. Evidence of an increased level of awareness of biodiversity conservation by villagers.

3. Evidence of villager advocacy for extension of biodiversity conservation.

C. Impact on Practices - A description of biodiversity conservation practices.

1. User group organization.

2. Methods of protection.

3. Methods of harvest and product distribution.

4. Description of sanctions.

D. Socio-economic impacts

1. Evidence of increased benefits to the community.

2. Evidence of increased benefits to individual user group members.

3. Evidence of development activity funded through the sale of community forest products.

E. Program effectiveness

1. Evidence of equitability (cast, tribal, proximity) in the management of the habitat.

2. Evidence of the addressing of gender concerns in habitat management.

E. Program Sustainability

1. Description of the external inputs provided in establishing and managing the habitat.

2. Description of the external inputs that are perceived to be necessary to future biodiversity conservation management.

3. Team's assessment of the sustainability of the biodiversity conservation efforts.

4. Continuation of government inputs.

5. Continuation of NGO inputs.

6. Sustainability of the Users group (economic and institutional).

7. Sustainability of the resource under management.

G. Replicability

1. Evidence of program replication beyond project input sponsored areas.

2. Evidence of increased participation of villages within project sponsored areas.

KEY PROGRAM IMPACT INDICATORS LIST

Field Visit Site: _____ Date: _____

Technical Indicators[1]

__ Years habitat has been officially protected.

__ Habitat size, perimeter length.

__ Miles of internal roads.

__ Miles of internal trails.

Social Indicators

__ Representative membership of all stakeholders. How participatory has the process of Habitat User Group (HUG) formation and function been?

__ Local leadership. How representative of the community is HUG leadership?

__ Quality of HUG Leadership. How involved and committed to the success of the HUG is the leadership?

__ Extent of women's involvement. How extensive has been women's involvement in the function of the HUG?

__ Sense of stewardship/responsibility for resource. How developed is the sense of "ownership" among stakeholders for the resource?

__ Incentives for participation. How extensive and enduring are the incentives for stakeholders to participate in HUG?

Institutional Indicators

__ HUG origins. To what extent was the HUG formed from the "bottom up"?

__ Security of rights. How secure are the rights of stakeholders to their resources? To what extent to the stakeholders understand their rights?

__ Planning. If the HUG has an operational plan, to what extent

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[1] Ranking: 3=High; 2=Moderate; 1=Low

is the operational plan collectively derived and understandable to all stakeholders?

__ Training. To what extent did/does project staff/government staff provide training to HUG members in development of operational plan and HUG management?

__ Technical Support. What is the level of technical support available to the HUG (e.g., from Line Departments, form project)?

Economic Indicators

__ Changes in land use/resource use patterns. Extent to which project inputs have affected existing land use/resource use patterns.

___ Benefits/Costs. How do the benefits of project/HMG inputs compare to the cost of the project inputs?

___ Cost effectiveness. Extent to which project/HMG inputs incorporated low cost local resources.

___ Changing employment patterns. Extent to which local employment opportunities have improved as a result to project/HMG inputs.

__ Improved markets. Extent to which project/HMG inputs have improved marketing opportunities for beneficiaries.

__ Sustainability. Extent to which project/HMG benefits are likely to continue when project inputs are completed.

Tourism and Hotel Operators Questionnaire

1. Name and Position of Interviewee:
   a. How did he or she enter hotel business?

2. Name of establishment:

3. Number of rooms
   a. Electricity Yes___; No___. River view: Yes___; No___.

4. Date Established:

5. Rate per night:

6. What do tourists request most from the guides (to see)?

7. What do you do to better educate the tourists about the forests, the wildlife, and the local people?

8. What does the hotel do to influence the impact on the park?

9. Overall, do you think the tourist business has a positive or negative impact on the

a. vegetation of the park
b. Wildlife resources in the park
c. On the environment outside the park

10. What could the government do to help hotel owners become better partners in managing the park?

11. Describe your experiences with:

a. anti-poaching units
b.
c.

12. Have you learned about conservation? If so, how?

13. What controls or regulations (including changes) would enable Sauraha to develop as a desirable destination for tourists?

APPENDIX B

MANAGEMENT OF PROTECTED AREAS IN NEPAL

Early History

1. In Sept. 1958, IUCN received a message from Kathmandu that only about 35 rhinos remained in Nepal, the rest had been killed by poachers. On receipt of this message the SSC of the Union arranged for Mr. E.P.Gee to visit Nepal to investigate the distribution and status of the Great Indian Rhinoceros in Nepal and to suggest measures for its preservation.

2. Nepal Government has been aware of the danger that if the influx of human settlers continues unchecked wildlife will ultimately disappear from this renowned place (Chitwan).

3. During the winter of 1957-58 steps were taken to allot a part of the north of the valley as a national park.

4. In Jan. 1959, the Mahendra Mirga Kunja (Mahendra Deer Park), or Mahendra National Park, of 68 Sq. miles (175 sq.km.) was formally opened by King Mahendra.

5. A wildlife sanctuary was proposed to be created south of this National Park to include Most of the rhinoceros.

6. E.P. Gee made a second visit of Chitwan in March 1963 and reported that the park actually became invaded by settlers at two Places and was discontinued as a national park -- partly because the required legislation had never been enacted.

He had recommended that for the preservation of the country's flora and fauna, as well as for the development of tourism in order to obtain more foreign exchange it is necessary to constitute national parks and sanctuary both in the "terai" for Low elevation fauna and also in the Himalayas for high elevation fauna.

7. In about 1964 H.M. King Mahendra gave instructions for this area, together with area South of the river Rapti which is the main habitat of the rhinoceros to be given sanctuary status. The boundaries were to be demarcated and some villages evacuated, increasing the total sanctuary area from 350 Km. to about 800 Km. In 1965, this work was completed by the termination of all human occupancy and the resettlement of some 4,000 people elsewhere (UN list of Protected Area).

A sanctuary of about 200 sq.miles has been proposed (but not gazetted) in the Rapti valley. As this sanctuary's major function is to protect the last remaining rhino in Nepal, this species will

been recognized in Nepal as an animal of distinction. It was proclaimed a "royal animal" by Jung Bahadur about 1846 (Scythes, 1942). Since that time no killing of a rhino without expressed permission of the rules of the country has been an illegal get.

From 1950 to 1968 the rhino population of Nepal decreased by about 88%.

With efficient control of poaching the top priority now should be protection of the habitat. As a follow up this program a wildlife management advisor from UNDP/FAO made detail recommendation for the creation of RCNP.

(1) Date established: Created in 1973, following approval by the late King Mahendra in December 1970.

(2) The by-laws (Royal Chitwan National Park Regulation were introduced on 4 March 1974.

(3) substantial additions were made to the area in 1977 and in adjacent Parsa Wildlife Reserve (499) sq.Km.) was established in 1984.

(4) The total area of RCNP is 932 Sq.Km.

The purpose defined in UNDP Plan of Operation:

To ensure the more effective conservation and management of the country's valuable but diminishing wildlife resources and their habitats by establishing national parks and reserves which, in addition to their conservation role, would be able to play a valuable part in the development of Nepal's growing and economically important forested industry.

The Management Plan summarizes the Chief reason for establishing RCNP is for the conservation of the indigenous Terai Fauna in their natural habitats.

In the beginning efforts were made to stop all the resources exploitation within RCNP by the local people including grazing. The resentment and acrimonious feeling between park staff and local people reached to the climax the total exclusion of the local rights over the resources did not worked towards the success of conservation. In 1976.

Park Management responded to local demand for thatch grass cutting for 20 days each year during winter seasons. The grass cutting duration was reduced to 15 days in 1981 to reduce firewood smuggling.

Evolution of Park Management

1. The National Parks and Wildlife Conservation Act was passed in March 1973.

The Act provided basic laws for the establishment and

management of national park and other protected areas. Also provided control and management of the wildlife resources of Nepal.

Under the provision of this Act the following Regulations have received the legal status for management and control of the respective areas.

i) The Royal Chitwan National Park Regulations (1974);
ii) the National Parks and Wildlife Conservation Regulations (1974);
iii) the Wildlife Reserve Regulations (1975);
iv) the Himalayan National Park Regulations (1979); and
v) the Khaptad National Park Regulations (19..)??

2. In 1974, when RCNP Regulations was formulated, the concept of people's recognition, their acceptance of the conservation area and their involvement or participation in conservation of national park was not considered necessary.

3. On the other hand, the local manager never thought how the demand of firewood, fodder, and grazing will be met, once the surrounding forest resources disappears due to excessive misuse including caring for agriculture.

4. New Concepts:
With successive amendments in the Act, the concept of people's involvements in conservation has been incorporated in the Act. The provision has been made in the successive amendments to provides natural resources from the protected areas for the local people's requirement.

The other addition was the creation of conservation area for the conservation of natural environment with sustainable use of natural resources with multiple use resource management concept.

Also such conservation area can be handed over to Non-Government Organization established with natural resource conservation objective.

5. With the fourth amendment done in 1993, a new category of protected area the Buffer Zone Area has been provided by the National Parks and Wildlife Conservation Act. An User Group Committee is authorized to managed and use resources from such protected area.

6. An outstanding amendment in the Act is the provision of Park revenue sharing from 30 to 50 percent with local people for the community development work and small activities. This has been envisaged to contribute significantly people's support for conservation.

7. During the 20 years of development of national parks and

protected areas in Nepal, concept has evolved from puristic conservation model to conservation for people through people.

National Conservation Strategy

1. A National Conservation Strategy for Nepal was endorsed by the HMG in 1988.

2. On National Parks and Protected Areas; it indicates that

i) there is gap in present protected area systems;
ii) lack of Comprehensive Management Plan;
iii) Wildlife related problems--damages;
iv) social and economic hardship due to restrictions placed upon the customary harvesting of practices; and
v) acrimonious relationship between local villagers and Park administration and management.

The NCS recommends that:

i) Refined the broad geographical division to include missing ecosystems, particularly seriously threatened ;
ii) Management plans to be prepared based on the accepted guidelines;
iii) Resettlement of people from the existing or proposed parks should be avoided;
iv) Identify Management zones within the Protected Area;
v) As a lead agency DNPWC, will take care of (a) management of visitor traffic; (b) regulation concerning lodge operation; (c) wildlife killing; (d) further consideration for more protected areas; and (e) establish communication with other agencies creation of new protected areas.

Nepal Environmental Policy and Action Plan (NEPAP)

In the foreword, Prime Minister says that the endorsement of the National Conservation Strategy in 1988 and the follow up NPC/IUCN/NCS Implementation Project have presided a basis for much of the NEPAP WORK.

The Nepal builds on these initiatives: it identifies major Nepal Environmental Policy and Action Plan (NEPAP) environmental problems facing Nepal, briefly reviews the causes and consequences of these problems and recommends practical policy guidelines and action to address them.

APPENDIX C

DESCRIPTIVE PROFILE OF ROYAL CHITWAN NATIONAL PARK AND PARSA WILDLIFE RESERVE

IUCN Management Category: II (National Park); Designated as a World Heritage Site by UNESCO in 1982. (Criteria: ii, iii, iv.)

Biogeographical Category: Indus-Ganges Monsoon Forest

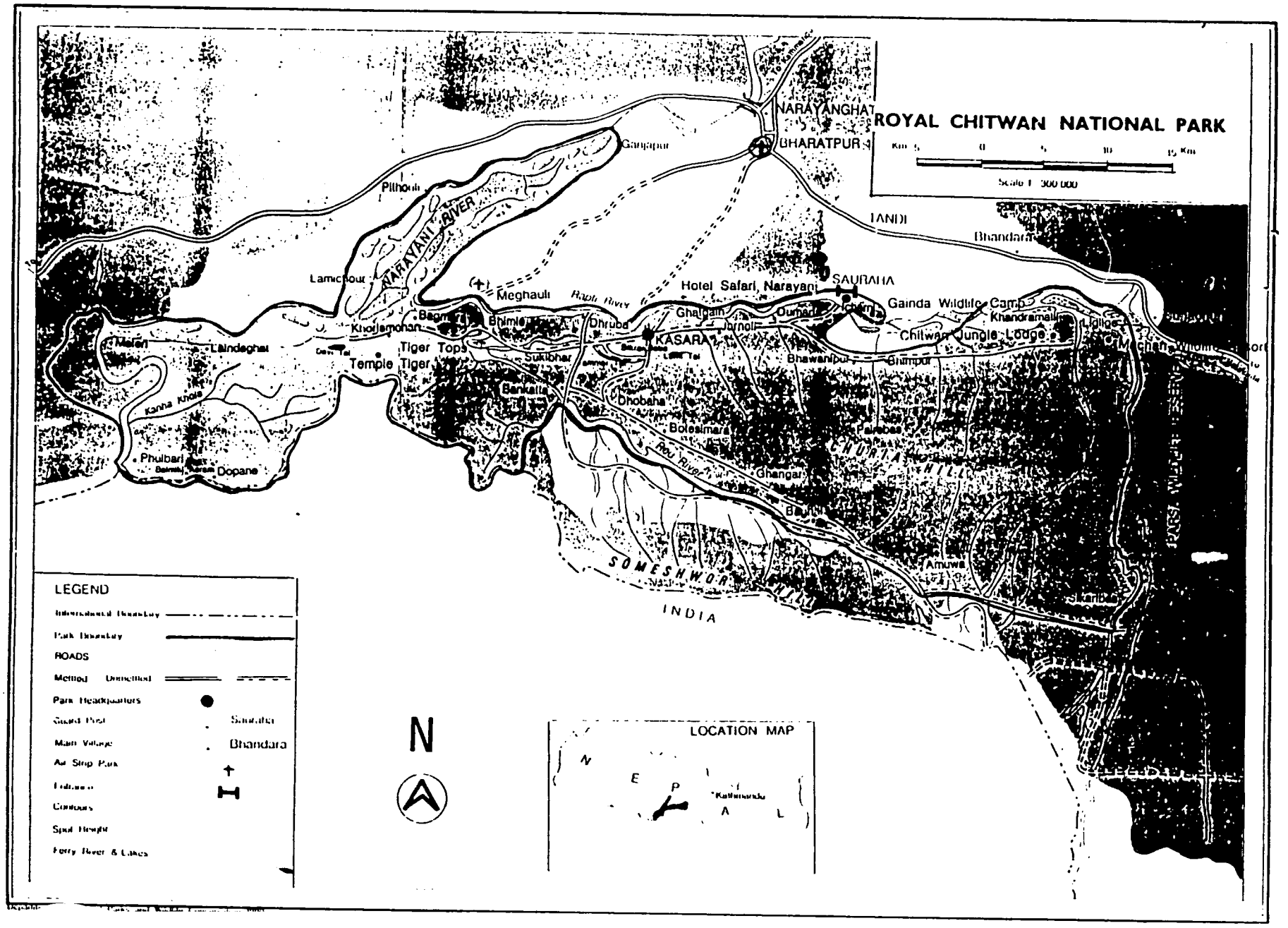
Location: Chitwan lies in the lowlands or Inner Terai of southern central Nepal on the international border with India. The park's boundaries extend from the Dauney Hills on the west bank of the Narayani River eastward 78 km to Hasta and Dhoram rivers. The park is bounded to the north by the Narayani and Rapti rivers and to the south by the Panchnad and Reu rivers and a forest road. Parsa Wildlife Reserve is contiguous with the eastern boundary of the park and extends as far eastward as the Bheraha and Bagali rivers.

History: Prior to the 1950s Nepal's forests were abundant, in the hills and in the Terai. Perhaps 50 percent of the country was still forested. Hill villages were connected by foot trails. The low lying plains of the Terai, although served by the Indian Railway system, were deeply forested and sparsely inhabited because of malaria. Except for government cutting of Sal trees to sell to India for railroad ties, the forests were mostly unexploited commercially. In both the hill country of the west and in the east, powerful customs served to manage the forests well. In the Terai in 1927, forests covered nearly ninety percent of the area.

Between 1846 and 1951, prior to the malaria eradication program in Chitwan Valley, the ruling Rana of Nepal had designated and utilized the habitat Chitwan Valley as a hunting reserve. The toll on wildlife was often heavy.

After the fall of the Rana and the launching of the malaria eradication program, extensive immigration from the hills led to massive conversion of the Terai forests to agricultural land. By the early 1960s malaria was eradicated from the Terai; the following years, catastrophic flood inundated most of the hills. GON initiated a planned resettlement scheme involving substantial clearcutting of the Terai forests. A large number of hill people migrated to the Terai plain with the hope of a better life and new lands available for agriculture.

Rice, maize, wheat, and mustard are the major crops. Aside from crop cultivation, traditional modes of extraction of natural resources by villagers continued. These included livestock grazing and collecting fodder; burning grasslands to facilitate thatch collection and improve grazing; utilization of forests to fulfill various household needs such as for beams, poles, fences and other building materials; for firewood, wild edibles, tubers, oats,



medicinal herbs, and honey; and for game and fish. The contemporary ecosystem represents the cumulative effect of all these activities which greatly modified successional patterns of vegetation and directly as well as indirectly changed the patterns and densities of wildlife species likewise.

The government resettlement scheme, however, could not absorb the large scale migration, and rampant encroachment of the Terai forests began. Despite the placement of armed soldiers in many areas, substantial areas of the Terai forests continued to be lost through encroachment and illegal settlement. Limited resources for forestry development and an insufficient forestry field organization for regulation enforcement could not stop the increasingly rapid deforestation. Poaching subsequently intensified.

The rate of forest depletion was calculated to be 49 percent between 1927 and 1977. By 1977, forest cover had been reduced to 44 percent from its original figures of almost 90. The present land use in Chitwan Valley shows a forest cover of about 65 percent and cultivated land of 21 percent (Nepal and Webber 1993). Similarly, the wildlife habitat was destroyed extensively, which resulted in the rapid decline of the wildlife population. The rhinoceros population dwindled from 1,000 in 1951 to 90 in 1969-or by over 90 percent. The population of tigers was reduced to 25. Wildlife species such as water buffaloes and swamp deer became extinct (Nepal and Webber 1993).

Chitwan was declared a national park in 1973, following approval by the late King Mahendra in December 1970. The by-laws for the Royal Chitwan National Park (RCNP) were introduced on 4 March 1974. Substantial additions were made to the park in 1977 and the adjacent Parsa Wildlife Reserve was established in 1984. The new park benefitted from having been well protected as a royal hunting reserve during the Rana regime. An area south of the Rapti River was first proposed as a rhinoceros sanctuary in 1958 (Gee, 1959), demarcated in 1963 and later incorporated into the national park. Chitwan was designated as a World Heritage site in November 1984.

Population doubled during the 1970s. The population pressure on these protected areas within Nepal are acute and growing. About 19 percent of the total forest in Nepal in 1964-65 was converted to other land-uses by 1986, at an annual reduction of about 1.0 percent. The greatest loss was from the Terai and Siwaliks areas, where the RCNP is located (Sharma, p. 88). Some 260,000 people occupied 320 villages around the boundary of RCNP in 1980 [update]; the population continues to grow at about 6 percent annually. Many of the communities close to the park boundaries lack fuelwood and grazing land. For generations, local people had used the park area to collect fuelwood, graze livestock, and collect tall grasses.

While some areas are quite fertile, much of the land under present forest cover is only moderately suitable for agriculture due to deficiencies in soil and topography. The flood plains along the Rapti river are also not suitable for cultivation due to frequent flooding and riverbank erosion and, hence, are more suitable for grazing. The forested land south of the park is considered largely unarable. Likewise, the core of the national park, with its steep slopes, is also less than ideal for crop cultivation. Given these limiting factors, about the only arable land available is the presently cultivated area. Thus, any further extension of cultivated land could only be marginal at most. (Nepal and Webber 1993).

Area: Chitwan was enlarged from 54,400 hectare to its present size of 93,200 hectare in 1977. Parsa Wildlife Reserve covers 49,900 hectare. There was a proposal to further enlarge the protected areas complex by establishing the 25,900 hectare Bara Hunting Reserve, adjacent to and east of Parsa Wildlife Reserve, but this has been dropped.

Land Tenure: State

Altitude: Ranges from 150m to 815m on the Churia Range.

Physical features: Chitwan is situated in a river valley basin or dun, along the flood plains of the Rapti, Reu and Narayani Rivers. The Someswar and the Dauney hills form the southern catchment and both drain into the Narayani. The Churia Hills bisect the park, the northern face falling within the catchment of the Rapti and southern side forming the catchment of the Reu. The Rapti is bounded by the Mahabharat Range on the north. Both the Rapti and Reu flow westward and drain into the Narayani, which meanders southward for about 25 km thorough a narrow gorge between the Someswar and Dauney hills until it reaches the Nepal-India border. Here it is dammed near Tribenighat. The Narayani is also called the Gandaki and is the third largest river in Nepal. It originates in the high Himalaya and, after joining the Ganges in India, drains into the Bay of Bengal.

The Churia, Someswar and Dauney hills constitute part of the Siwaliks which are characterized by outwash deposits carried from the north. All the rocks are of Pliocene or Pleistocene, fluviatile origin and consist mainly of sandstone, conglomerates, quartzite, shales and micaceous sandstone. The Siwaliks show a distinctive fault pattern that has produced steep cliffs on the south-facing slopes, where vegetation cover is poorer than the northern slopes. The Mahabharat Range consists of severely eroded pre-Siwalik quartzite, phyllites and sandstones. The flood plains comprise a series of ascending alluvial terraces laid down by the rivers and subsequently raised by Himalayan uplift. The terraces are composed of layers of boulders and gravels set in a fine silty matrix. There is a rough gradient from the higher-lying boulders and gravels to

sands and silts and then to the low-lying silt loams and silty clay loams.

Climate: Conditions are subtropical with a summer monsoon from mid--June to late-September, and a relatively dry winter. Mean annual rainfall is 2400 mm with about 90% falling in the monsoon from June to September. Monsoon rains cause dramatic floods and changes in the character and courses of rivers. Temperatures are highest (max 38 c) during this season and drop to a minimum of 6 c in the post-monsoon period from October to January, when dry northerly winds sweeping down from the Himalaya and Tibetan Plateau.

Cultural Heritage: The indigenous Tharus have lived in the Chitwan area for centuries. Their origin is a mystery. A historical account from the seventh century notes that the "cities were juxtaposed to the forests from a very early time." Perhaps the city dwellers were the Tharu. Their way of life differs from that of the recent settlers from the hills, who came pouring into the Inner Terai following the eradication of malaria in the 1950s. The Tharu still are well distributed throughout Chitwan Valley; however, among the five VDC areas, they form the major concentrations in Bachyoli and Padampur. They maintain distinctive customs, religious beliefs and moral values, which are closely attached to the natural system. The Tharu are widely believed to be less aggressive than in-migrants from the hills in trespassing into the park. Aside from agricultural crop production, the Tharu rely heavily on wild edibles available in the park. Collection of roots and tubers is part of their way of life which they find difficult to live without.

Local Human Population: Padampur Panchayat, located immediately to the south of the Rapti River, is a heavily populated area as well as providing some of the last remaining habitat for tiger, rhinoceros, and gharial.

In the 1950s, with the fall of the Rana regime and the eradication of malaria from the area, the human population of Chitwan rose from 36,000 to 100,000 between 1950 and 1960. By 1980 there were 261,300 people in 320 settlements around the park.

Visitor and visitor facilities: Chitwan is one of the most popular tourist destinations outside Kathmandu and Pokhara. Visitor numbers have risen from less than 1,000 in 1974 to almost 60,000 at present. Tiger Tops operates a Jungle Lodge and Tented Camp in the west of the park, and Tharu Village Resort peripheral to the park. Its Jungle Lodge pre-dates the park, having been set up by John Coapman in the mid 1960s. Other concession lodges inside the park are Chitwan Jungle Lodge and Machan Wildlife Resort in the east, and Tiger Temple in the west. Similar luxury lodges on the edge of the park are Gainda Wildlife Camp and Elephant Camp at Sauraha, and Island Resort and Narayani Safari. There are over 40 low-budget lodges and guest houses outside the park. Sauraha has a good visitor information center. There are no provisions for visitors

in Parsa Wildlife Reserve, and no visitors were recorded in 1989.

Research Facilities: A proposal to establish the Nepal Conservation Training and Wildlife Institute has been made by the King Mahendra Trust for Nature Conservation, the Department of National Parks and Wildlife Conservation, Tribhuvan University and the Institute of Forestry. The Smithsonian-Nepal Terai Ecology Project has its field station at Sauraha, where accommodation and facilities for scientists are available.

Management: The government agency responsible for the park is the Department of National Parks and Wildlife Conservation.

The staff includes one chief warden, one warden, two assistant wardens, 11 rangers, 11 senior game scouts, 44 game scouts and 29 office staff. One battalion of the Royal Nepal Army is stationed in the park for enforcement duties. Elephant staff total 67 at Chitwan and 34 at Birganj.

Expenditure, excluding military presence, was $81,578 US and income was $448,000 in 89-90. Income was derived from entrance and camping fees (65..4 percent); elephant rides (14.4%); hotel concessions 12.2 %; grass cutting permits 2.3%; and various other sources 5.6%. The budget for 90-91 is $99,000.

Conservation Value: Chitwan National Park and the adjacent Parsa Wildlife Reserve constitute the largest and least disturbed example of sal forest and associated communities of the Terai, with a long history of protection dating back to the early 1800s in the case of Chitwan. Species diversity is high, notably for mammals and birds which are well documented. Chitwan supports the world's second largest population of Indian rhinoceros and is also an important refuge for tiger and gharial. Its tall grasslands and riverain forest support a very high wild ungulate biomass which greatly exceeds that reported elsewhere in the Indian subcontinent. Large numbers of visitors are attracted to the area because of its exceptional natural beauty, with the distant Himalaya providing a spectacular backdrop to views of forested hills, grasslands, and great rivers. Research on the natural history of the area has been an important contribution to understanding ecological systems in the Terai.

The climax vegetation of the Inner Terai is sal *Shorea robusta* forest, which covers some 70% of the park. However, floods, fires and riverain erosion combine to make a continually changing mosaic of grasslands and riverain forests in various stages of succession. Purest stands of sal occur on better drained ground such as the lowlands around Kasara in the center of the park. Elsewhere, sal is intermingled with pine *Pinus roxburghii* along the southern face of the Churia Hills and with tree species such as *Terminalia belerica, Dalbergia latifolia, Anogeissus latifolius, Dillenia indica* and *Garuga pinnata* on northern slopes. Creepers, such as

Bauhinia vahlii and *Spatholobus parviflorus*, are common. The understorey is scant with the exception of grasses such as *Themeda villosa*. Riverain forest and grasslands, which form a mosaic along the river banks, are maintained by seasonal flooding. *Khair-sissoo Acacia catechu-Dalbergia sissoo* associations predominate on recent alluvium deposited during floods and in lowland areas that escape the most serious flooding. *Semal-bhellar Bombax ceiba-Trewia nudiflora*, with understorey shrubs *Callicarpa macrophylla*, *Clerodendrum viscosum* and *Phyllanthus emblica*, represent a later stage in succession. Two other types of riverain forest (Eugenia woodland and tropical evergreen forest) occur in areas outside the present boundary of the park.

Laurie (1978) identified seven major grassland types, which constitute about 20 percent of the park's area; *Themeda villosa* forms a tall grass cover in clearings in the sal forest; *Saccharum-Narenga* associations grow as mixed and pure stands of tall grass (*Saccharum spontaneum* is one of the first species to colonize newly created sandbanks); *Arundo-Phargmites* associations form dense tall stands along stream beds on the flood plain and around lakes; *Imperata cylindrica* grows prolifically in areas within the park which were occupied by villages prior to their evacuation in 1964; various short grasses and herbs grown on exposed sandbanks during the dry months and become much more prolific with the onset of rain in May (e.g. *Polygonum plebeium, Persicaria spp.* and sedges such as *Syperus, Kyllinga* and *Marscus spp.*); *Cynodon dactylon* and *Chrysopogon aciculatus* and other short grasses grow in highest areas near riverain forest all the year round; and low-lying stands of Saccharum spontaneum, which are destroyed by repeated flooding early in the monsoon. A list of plant species is given by Laurie (1978).

A detailed account of the park's fauna is given by Gurung (1983). Over 40 species of mammals have been recorded. Prior to its reintroduction to Royal Bardia National Park in 1986, the park contained the last Nepalese population of the Indian rhinoceros *Rhinoceros unicornis (E)*. This had increase from about 300 in 1975 to about 350 in 1986. It is currently estimated at 375-400. Tiger *Panthera tigris (E)* is present and has been the subject of a long-term study begun in 1974. The population increased from an estimated 25 in 19774 to 70-110 in 1980, of which 24-30 are resident breeders at any one time, but has recently crashed. Half of the resident tigers in the western portion of the park disappeared during the 1990 monsoon and two-thirds of dependent young were also missing. Leopard *Panthera pardus (T)* is widespread and other threatened mammal species include wild dog *Cuon alpinus (V)*, sloth bear *Melursus ursinus (I)*, Ganges river dolphin *Platanista gangetica (V)*, and gaur *Bos gaurus (V)*. Hispid hare *Caprolagus hispidus (E)* is also present. The sloth bear population totalled 50-60 in 1979. The river dolphin population may have declined following the construction of a dam towards the Indian border. Seven were recorded in 1980 but non in 1990. Wild elephant *Elephas*

maximus (E) occasionally pass through the Churia Hills. Other mammals include:

rhesus macaque *Macaca mulatta,*
common langur *Presbytis entellus,*
smooth-coated otter *Latra perspicilata,*
yellow-throated marten *Martes flaviggula,*
ratel *Mellivora capensis,*
spotted linsang *Prionodon pardicolor,*
large Indian civet *Viverra zibetha,*
small Indian civet *Viverricula indica,*
common palm civet *Paradozurus hermaphroditus,*
Himalayan palm civet *Paguma larvata,*
mongoose *Herpestes spp.,*
fishing cat *Felvis viverrina,*
leopard at *F. bengalensis,*
jungle cat *F. chaus,*
jackal *Canis aureus,*
striped hyena *Hyaena hyaena,*
Indian fox *Vulpes bengalensis,*
sambar *Cervus unicolor,*
hog deer *C. porcinus,*
spotted deer *C. axis,*
Indian muntjac *Muntiacus muntjak,*
wild boar *Sus scrofa,*
Chinese pangolin *Manis pentadactyla,*
five-striped palm squirrel *Funambulus pennanti,*
Indian porcupine *Hystrix indica*
and Indian hare *Lepus nigricollis.*

The wild ungulate biomass within riverain/tall grass habitats has been estimated at 18,590 kg/sq.km, far exceeding that reported anywhere else in the Indian sub-continent. Most mammals found in the park also occurs in Parsa Wildlife Reserve with the exception of hog deer. Four-horned antelope *Tetracerus quadricornis* occurs in Parsa, on the southern slopes of the Churia Hills, and the reserve contains Nepal's only reproducing herd of about 21 elephants.

A larger number of bird species has been recorded in Chitwan (489 total). A larger number of bird species has been recorded in Chitwan (4489 total) than in any other protected area in Nepal. This is because of the park's wide range of habitats and location within the tropical lowlands of Central Nepal where eastern and western species overlap in their range. There are ten breeding species for which Nepal may hold internationally significant populations including Bengal florican *Houbaropsis bangalensis (E)* and rufous-necked laughitng-thrush *Garrulax ruficollis.* It is the only locality in the country for striped buttonquaail *Turnix sylvatica,* bristled grass warbler *Chaetornis striatus* and slender-billed babbler *Turdoides longirostris.* In addition, Chitwan is the only protected area where the following species considered to be at rick in Nepal have been found:

yellow bittern *Ixobrychus sinensis*,
black baza *Aviceda leuphotes*,
laggar falcon *Falco jugger*,
blue-breasted quail *Caoturnix chinensis*,
thick-billed green pigeon *Treron curvirostra*,
mountain imperial pigeon *Ducula badia*,
vernal hanging parrot *Loriculus vernalis*,
red-winged crested cuckoo *Clamator coromandus*,
banded bay cuckoo *Cacomantis sonneratii*,
tawny fish owl *Ketupa flavipes*,
white-vented needletail *Hirundapus cochinchinensis*,
deep blue kingfisher *Alcedo meninting*,
white-browned piculet *Sasia ochracea*,
long-tailed broadbill *Psarisomus dalhousiae*,
hooded pitta *Pitta sordida*,
white-throated bulbul *Criniger flaveolus*,
lesser necklaced laughing-thrush *Garrulax monileger*,
greater necklaced laughing thrush *G. Pectoralis*,
ruby-cheeked sunbird *Anthreptes singalensis*
and little spinderhunter *Arachnothera longirostra*.

Chitwan is very important for winter birds (about 160 in total), both winter visitors from outside Nepal and many altitudinal migrants which descend to the lowlands outside the breeding season, as well as a valuable staging point for numerous passage migrant species.

Some 19 species of snake occur in the park including king cobra Ophhiophagus hannah, green pit viper *Trimeresurus albolabris*, common krait *Bungarus caeruleus* and Indian python *Tython molurus (V)*. Other notable reptiles are mugger *Crocodylus palustris (V)* (declining from at least 200 in 1978 to 70 in 1986/1988), gharial *Gavialis gangeticus (E)*, Indian starred tortoise *Geochelone elongata* and monitor lizards *Varanus spp*. Some 113 species of fish have been recorded, including *Barilius Spp.*, *Tor tor*, *T. putitora* and *Puntius spp*.

APPENDIX D

BIODIVERSITY PROTECTION LEGISLATION

PART ONE: AMENDMENT TO THE NATIONAL PARKS AND WILDLIFE CONSERVATION ACT 2029

This act is enacted to amend the National Parks and Wildlife Conservation Act of 2029 (1973).[1]

Preamble: It is necessary to amend National Parks and Wildlife Conservation Act of 1973.

This act has been enacted by the parliament on the occasion of this 22nd year of the reign of his Majesty King Birendra Bir Bikram Shah Dev.

1. Short Title and Commencement: (1) This act may be called the National Parks and Wildlife Conservation Act (Fourth Amendment) of 1973.

(2) It shall come into force immediately.

2. Amendment to section 2 of the National Park and Wildlife Conservation Act of 1973:

> *(1) "Buffer zone" means the area surrounding a national park or reserve as defined by section 3a — to provide for the use of forest resources on a regular and beneficial basis for the local people.*
>
> *(2) After clause (i) the following section (ii) is added:*
>
> > *"(ii) "warden" means a person appointed by His Majesty's Government for the conservation and management of a national park, reserve, conservation area, or buffer zone.*
>
> *3. Add section 3a, 3b and 3c in the Original Act: After section 3 of the original act the following sections 3a, 3b and 3c are added:*
>
> > *3a. Buffer zone area may be declared:*
> >
> > *(1) His Majesty's Government may declare any area surrounding a national park or reserve as a buffer zone by notification in the Gazzette (Nepal Raj Patra) by indicating the boundaries thereof.*

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[1] Translation supplied by Robert Keiter, Senior Fulbright Scholar and Professor of Law, University of Utah, Salt Lake City.

(2) When a buffer zone is declared in accordance with subsection (1), His Majesty's Government may either leave or transfer ownership of the area or change the boundary by publishing in the Gazzette.

3b. Management and Conservation of Buffer Zone:

Management and conservation activities in the buffer zone area shall be done by the warden. But providing that the management and conservation of this area shall not have any effect on the land ownership of local people.

3c. Compensation shall be given:

If any local inhabitant's house or land located within a buffer zone, either following a flood or landslide, shall be moved within the existing natural boundary of a national park or reserve and if such inhabitant's house is removed, on the recommendation of the user group committee formed in accordance with section 16c, reasonable compensation shall be given to such person from the amount allocated in accordance with section 25a for community development of the local people.

4. Amendment to section 6 of the Original Act:

Instead of the words "national park or reserve" mentioned different places in section 6 of the Original Act, the words "national park, reserve or conservation area" have been inserted.

5. Section 16c is added to the Original Act:

After section 16b of the Original Act, the following section 16c is added:

"16c. User Group Committee:

(1) For the management of fallen trees, dry wood, firewood and grass in a national park, reserve, conservation area or buffer zone, the warden, in coordination with the local agency, may form a user group committee.

(2) Besides the provision in subsection (1), other rights and duties of the user group committee shall be as prescribed.

6. Amendment to section 22 of the Original Act:

Instead of the words "national park or reserve" in section 22 of the Original Act, the words "national park, reserve, conservation area, and buffer zone" have been inserted.

7. *Amendment to section 25 of the Original Act:*

Instead of subsection (1) of section 25 of the Original Act, the following subsection (1) is added:

> *"(1) Any person who furnishes information about a poacher who kills or injures rhinoceros, tiger, elephant, musk deer, clouded leopard, snow leopard or gour that leads to an arrest may rewarded up to Rs 50,000 in cash, and any person who furnishes information about a poacher who kills, or injures protected wildlife other than mentioned above, which leads to an arrest may be rewarded up to Rs 25,000 in cash."*

8. *Section 25a is added to the Original Act:*

The following section 25a is added after section 25 of the Original Act:

> *"25a. May be spended for the local development: From 30 to 50 percent of the amount earned by the national parks, reserves or conservation areas may be expended, in coordination with the local agency, for community development of the local people.*

9. *Amendment to section 26 of the Original Act:*

Instead of subsection (1) and (2) of section 26 of the Original Act, the following subsection (1) and (2) is added:

> *"(1) In an unlawful manner any person who kills, injures, purchases, sells or transfers rhinoceros, tiger, elephant, musk deer, clouded leopard, snow leopard or gour and who keeps, purchases or sells rhinoceros horn or musk-pods, fur of the snow leopard and trophies of other protected wildlife, shall be punished with a fine ranging between Rs 50,000 and Rs 100,000 or with imprisonment for a term ranging between five years and fifteen years or with both.*
>
> *(2) Any person who kills or injures other protected wildlife, other than those mentioned in subsection (1) shall be punished with a fine ranging between Rs 40,000 and Rs 75,000 or with imprisonment for a term ranging between one year and ten years or with both. This act is enacted to amend the National Parks and Wildlife*

Conservation Act of 2029 (1973).[2]

Preamble: It is necessary to amend National Parks and Wildlife Conservation Act of 1973.

This act has been enacted by the parliament on the occasion of this 22nd year of the reign of his Majesty King Birendra Bir Bikram Shah Dev.

1. Short Title and Commencement: (1) This act may be called the National Parks and Wildlife Conservation Act (Fourth Amendment) of 1973.

(2) It shall come into force immediately.

2. Amendment to section 2 of the National Park and Wildlife Conservation Act of 1973:

(1) "Buffer zone" means the area surrounding a national park or reserve as defined by section 3a – to provide for the use of forest resources on a regular and beneficial basis for the local people.

(2) After clause (i) the following section (ii) is added:

"(ii) "warden" means a person appointed by His Majesty's Government for the conservation and management of a national park, reserve, conservation area, or buffer zone.

3. Add section 3a, 3b and 3c in the Original Act: After section 3 of the original act the following sections 3a, 3b and 3c are added:

3a. Buffer zone area may be declared:

(1) His Majesty's Government may declare any area surrounding a national park or reserve as a buffer zone by notification in the Gazzette (Nepal Raj Patra) by indicating the boundaries thereof.

(2) When a buffer zone is declared in accordance with subsection (1), His Majesty's Government may either leave or transfer ownership of the area or change the boundary by publishing in the Gazzette.

3b. Management and Conservation of Buffer Zone:

Management and conservation activities in the

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[2] Translation supplied by Robert Keiter, Senior Fulbright Scholar and Professor of Law, University of Utah, Salt Lake City.

buffer zone area shall be done by the warden. But providing that the management and conservation of this area shall not have any effect on the land ownership of local people.

3c. Compensation shall be given:

If any local inhabitant's house or land located within a buffer zone, either following a flood or landslide, shall be moved within the existing natural boundary of a national park or reserve and if such inhabitant's house is removed, on the recommendation of the user group committee formed in accordance with section 16c, reasonable compensation shall be given to such person from the amount allocated in accordance with section 25a for community development of the local people.

4. Amendment to section 6 of the Original Act:

Instead of the words "national park or reserve" mentioned different places in section 6 of the Original Act, the words "national park, reserve or conservation area" have been inserted.

5. Section 16c is added to the Original Act:

After section 16b of the Original Act, the following section 16c is added:

"16c. User Group Committee:

(1) For the management of fallen trees, dry wood, firewood and grass in a national park, reserve, conservation area or buffer zone, the warden, in coordination with the local agency, may form a user group committee.

(2) Besides the provision in subsection (1), other rights and duties of the user group committee shall be as prescribed.

6. Amendment to section 22 of the Original Act:

Instead of the words "national park or reserve" in section 22 of the Original Act, the words "national park, reserve, conservation area, and buffer zone" have been inserted.

7. Amendment to section 25 of the Original Act:

Instead of subsection (1) of section 25 of the Original Act, the following subsection (1) is added:

"(1) Any person who furnishes information about a poacher who kills or injures rhinoceros, tiger, elephant, musk deer, clouded leopard, snow leopard or gour that leads to an arrest may rewarded up to Rs 50,000 in cash, and any person who furnishes information about a poacher who kills, or injures protected wildlife other than mentioned above, which leads to an arrest may be rewarded up to Rs 25,000 in cash."

8. Section 25a is added to the Original Act:

The following section 25a is added after section 25 of the Original Act:

"25a. May be spended for the local development: From 30 to 50 percent of the amount earned by the national parks, reserves or conservation areas may be expended, in coordination with the local agency, for community development of the local people.

9. Amendment to section 26 of the Original Act:

Instead of subsection (1) and (2) of section 26 of the Original Act, the following subsection (1) and (2) is added:

"(1) In an unlawful manner any person who kills, injures, purchases, sells or transfers rhinoceros, tiger, elephant, musk deer, clouded leopard, snow leopard or gour and who keeps, purchases or sells rhinoceros horn or musk-pods, fur of the snow leopard and trophies of other protected wildlife, shall be punished with a fine ranging between Rs 50,000 and Rs 100,000 or with imprisonment for a term ranging between five years and fifteen years or with both.

(2) Any person who kills or injures other protected wildlife, other than those mentioned in subsection (1) shall be punished with a fine ranging between Rs 40,000 and Rs 75,000 or with imprisonment for a term ranging between one year and ten years or with both.

PART TWO: ANALYSIS AND DISCUSSION OF THE BUFFER ZONE MANAGEMENT ACT

The following material has been excerpted from an unpublished report on the new buffer zone legislation. The report entitled, "Nepal's Buffer Zones Legislation: Leagal and Policy Issues," by Robert Keiter[3] (1993) summarizes the legislation and speculates on the likely impact of its implementation. It also raises a number of outstanding issues associated with the legislation. Because the new amendment so explicitly enables the type of participation that Chitwan has sought in practice and reflects the evolving paradigm described by the main report's authors, this discussion merits attachment to the body of CDIE's findings. Keiter writes:

INTRODUCTION

In 1993, Nepal passed the Fourth Amendment to the National Parks and Wildlife Conservation Act (hereinafter the Buffer Zone Management Act or BZMA or Act) to enable His Majesty's Government (HMG), acting through the Department of National Parks and Wildlife Conservation (DNPWC), to address natural resource problems occurring on lands adjacent to national park boundaries. The Act gives HMG authority to designate buffer zones on lands adjacent to national parks or reserves. The DNPWC, as the representative of HMG, cannot take ownership of private lands in the buffer zone areas, but it can assume responsibility for public lands administered by the Department of Forestry (DOF) or other governmental agencies.

The Chief Warden (or warden) is responsible for managing forest resources in designated buffer zone areas, but the law encourages him to form User Group Committees (UGCs) to promote local involvement in forest management. The law, however, does not specify the UGC's rights and duties, leaving that to be done through regulations or otherwise. In addition, the Act provides that 30 to 50 percent of the funds (30/50 funds) generated from park revenues (*e.g.*, entrance fees, hotel royalties, etc.) may be expended for local community development. In sum, the language and structure of the Act is designed to promote coordination between park authorities and local villages to protect the parks through responsible management of buffer zone forest resources and to ensure sustainable forest resources for local consumption.

SUMMARY

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[3]Robert Keiter was a Senior Fulbright Scholar in Nepal during the fall 1993. He is currently Professor of Law at the University of Utah, Salt Lake City.

The BZMA clearly authorizes HMG to designate buffer zone areas on lands surrounding national parks and reserves, and it also probably allows the HMG to designate buffer zones within existing national parks and reserves.

Representing HMG, the DNPWC can either assume ownership of forest lands within a designated buffer zone area or leave ownership with the Department of Forestry. Whenever the DOF will continue to administer buffer zone forest lands, the two agencies should clarify their relationship to avoid confusion and inconsistency. In any event, the warden is ultimately responsible for managing buffer zone area resources, though he may create local User Group Committees (UGCs) to assist in managing these resources.

The Act authorizes the dispersal of 30/50 funds for local community development, regardless of whether the community is located within the designated buffer zone area. Any community impacted by national park or buffer zone resource management policies should be eligible to participate on UGCs and to receive 30/50 funds. There is no legal prohibition against allocating the 30/50 funds to promote effective, innovative, and responsible resource management policies in designated buffer zone areas.

Although the BZMA precludes HMG from acquiring ownership of private lands within designated buffer zone areas, it does not prohibit regulation of private land use or development. Private land use might be regulated directly by limiting resource use or development on these lands, or it might be regulated indirectly by limiting access to buffer zone forest resources that might be used to develop the property.

To promote local cooperation as well as responsible local management, HMG should establish a connection between UGC management and the 30/50 funds to reward villages that successfully protect or sustain buffer zone ecosystems. HMG should promulgate regulations establishing a nonimpairment (or sustainability) management standard to guide UCG decisionmaking, and also give the warden a veto power over UGC decisions adversely impacting park resources.

The UGCs should have general management responsibility for buffer zone forest resources,. subject to clearly established resource management standards and the warden's veto authority. Local villages should be consulted before buffer zone designations are made, with wardens required to identify specific resource issues to be addressed through buffer zone management.

The BZMA provides HMG with an opportunity to regulate, either directly or indirectly, tourism and trekking infrastructure development, particularly lodge and teahouse construction which has a major impact on forest resources in areas adjoining established

parks.

Implementation of the BZMA will be an experimental process, subject to reassessment and adjustment with experience.

LEGAL ISSUES

The following legal issues are not fully addressed in the buffer zone legislation and require some further clarification:

Scope of buffer zone management authority. Does HMG's buffer zone management (buffer zone management) authority apply to villages or communities located inside national parks, or does it only apply to villages or communities located outside the national parks? Are local communities inside national parks entitled to any revenues from the 30/50 Fund?

The issue of whether buffer zone management authority extends to communities inside national parks is important because several parks contain local communities that use and depend upon park resources as well as resources located on adjacent lands. These communities are often heavy users (and sometimes abusers) of park resources as well as forest resources located outside the parks. If these communities are not covered by the legislation, HMG may find it difficult to secure local participation (through UGCs) in a joint resource management program or to assert regulatory authority, where necessary, over community resource use activities. In addition, if these communities are not covered by the BZMA, then they may not be eligible for 30/50 funds, a significant inducement for villages to pursue park-sensitive resource management polices.

Section 2(1) of the Buffer Zone Management Act (BZMA) defines "buffer zone" as "the surrounding area of a national park or reserve." In addition, section 3(a) of the BZMA gives HMG authority to declare a buffer zone for "any surrounding area of the national park or reserve." These statutory provisions, which only address surrounding areas, strongly suggest that buffer zone management authority extends to lands located outside, but not inside, existing national parks. However, section 5 of the BZMA authorizes creation of a User Group Committee (UGC) "for the management of fallen trees, dry wood, firewood and grass *in* a national park, reserve, conservation area, or buffer zone," thus implying that buffer zone management authority (which utilizes UGCs) can be exercised inside as well as outside existing national parks. Section 8 of the BZMA, which provides for dispersal of the 30/50 funds, does not distinguish between villages located inside or outside national parks, providing that these funds "may be expended, in coordination with the local agency, for community development of the local people."

In short, although the BZMA defines a buffer zone in terms of lands located outside national parks, it nonetheless allows buffer zone management tools (UGCs and 30/50 funds) to be used for communities located inside existing national parks. But even if buffer zone designations are not made inside national parks, the BZMA authorizes park communities to participate in UGCs and to receive 30/50 fund revenues.

One potential problem arises from this conclusion. In Royal Chitwan National Park and other terai parks, where there is intensive resource use by adjacent villages that spills into the park, park wardens might be pressured to designate buffer zones inside the park to accommodate village resource needs by opening the parks for local harvest. ... because the BZMA is designed to use buffer zones to protect park resources (not to open parks for exploitation), the legislation should not be read to give the DNPWC authority to create buffer zones inside parks to meet local resource demands.

Buffer Zones and Conservation Areas. By statutory definition, buffer zones are contemplated on the perimeter of national parks and reserves, while UGCs may be established for resource management in national parks, conservation areas, and buffer zones, and 30/50 funds may be expended for local villages regardless of location. As a practical matter, only the newly established Makalu-Barun National Park and Conservation Area currently involves a situation where a national park is bordered by a designated conservation area. Since the UGC and 30/50 fund tools can evidently be employed in conservation areas, regardless of whether a buffer zone has been designated, it may not be necessary to clarify the relationship between conservation areas and buffer zones.

However, because both of these designations are new park management tools that will likely be used again, it may be useful to clarify the relationship between buffer zones and conservation areas. Since buffer zones are designed to address areas of intense conflict on lands adjacent to national park boundaries, it would be helpful if HMG has authority to designate buffer zones inside conservation areas to highlight the need to manage particularly sensitive lands more carefully than other lands located in the conservation area. Designation of a buffer zone inside a conservation area should not change the administering agency since the DNPWC should already have authority in the conservation area. In short, neither the legislative language nor statutory policy seem to preclude use of the buffer zone designation authority in conservation areas adjacent to national parks.

Interagency Relations. The DOF is presently responsible for managing public forest lands outside existing national parks. For the most part, under the BZMA, it is these public forest lands that are subject to designation as a buffer zone. Once these lands are included in a buffer zone, the BZMA does not resolve the issue of

which agency is then responsible for (or owns) them. Section 3(a)(2) of the BZMA provides that HMG may either leave ownership of buffer zone lands with the DOF or transfer ownership to the DNPWC or another entity, or perhaps even change the boundary of the park itself by publishing in the Gazette. Section 3(b), however, indicates that the park warden is responsible for conservation and management activities in the buffer zone area, which seemingly gives him legal authority over the area regardless of which agency "owns" or administers the land. But even if HMG declares a buffer zone adjacent to an existing national park, the DOF will be responsible for the remaining public forest lands, which suggests the necessity of maintaining good relations between the two agencies.

If ownership of the buffer zone land is transferred to the DNPWC, then it would have full legal authority to administer and regulate forest practices within the designated area. But if ownership is not transferred to the DNPWC, then it is less clear exactly what legal relationship exists between the DNPWC and the DOF. ...if both departments can (or do) assert management authority over the area, the risk exists of inconsistent policies and strained relationships, or of local villages playing both departments off against one another. Neither of these situations would promote harmonious relations between the national parks and local villages, a key buffer zone management goal.

30/50 Fund Dispersal. The BZMA provision establishing the 30/50 funds does not contain any explicit limitations on distribution of these funds, except the requirement that the monies be expended for local community development. There is no requirement linking distribution of the funds to communities located within designated buffer zone areas. Moreover, the legislation provides that UGCs may be formed for management of resources inside national parks as well as within adjacent buffer zone areas. In short, the legislation contemplates use of 30/50 funds to promote responsible resource management both inside and outside national parks.

This analysis suggests that any community impacted by a buffer zone designation, whether located inside or outside the designated buffer zone, may be eligible to receive 30/50 funds.

Except for requiring coordination with a local agency, the statute is silent about how 30/50 funds should be allocated between local communities. The funds, therefore, should be used to reward villages that implement, through the UGCs, responsible (as well as innovative and sustainable) resource management programs.... the legislation does not require that the 30/50 funds be dispersed in accordance with where the funds are earned or local population size. This means that communities in the vicinity of the largest revenue producing parks are not necessarily entitled to the funds produced from those parks. This gives HMG flexibility to use these

funds to address the most serious buffer zone management problems, regardless of which park is concerned.

Regulation of Private Property. Under the BZMA, HMG is not authorized to acquire ownership of private lands located in a designated buffer zone (Sec. 3(b)), but it may assume ownership of public lands located in a buffer zone (Sec. 3(a)). This interpretation is supported by the provision specifically requiring compensation if a UGC recommends removal of a private house moved from a buffer zone into a national park by natural forces like a flood (Sec. 3(c)). The statute, however, does not prohibit the DNPWC, working in conjunction with a local UGC, from regulating private land use and development in these areas. Such a regulatory power is particularly important in areas where national parks are bordered by private lands subject to intensive development potentially detrimental to park ecosystems. This situation currently prevails on private lands outside Royal Chitwan National Park and in the Lukla corridor outside Sagarmatha National Park.

Indeed, in areas where national parks are bordered by private lands undergoing intensive development, the only effective buffer may be some regulation of development or resource use on those private lands. Direct regulatory controls could involve limitations on livestock numbers Alternatively, HMG might directly regulate private land use by imposing specific limitations on development, or it might indirectly regulate private land development by limiting access to forest resources. or fuelwood consumption, or lodge construction limitations or design requirements. Indirect regulatory controls could involve limitations on livestock grazing or fuelwood gathering, as well as limitations on timber cutting for lodge construction, on forest lands within designated buffer zone areas.

Policy Issues

Following is an examination of some of the many policy issues presented by the buffer zone legislation:

General or Specific Regulations. A combination of regulatory approaches probably makes the most sense. To ensure some uniformity in buffer zone designation criteria, the structure and operation of UGCs, and 30/50 fund management, HMG should promulgate universal regulations governing these aspects of buffer zone management. To address the diverse local problems that individual parks will encounter with buffer zone management, HMG should delegate considerable discretionary authority to park wardens to respond to the unique problems they each will confront. However, to ensure that wardens have sufficient authority in the field and to provide them with some political protection, HMG should be prepared to promulgate regulations to address particularly difficult local resource issues.

Securing Local Cooperation. Because the role of the UGCs and dispersal of the 30/50 funds is not specifically defined in the legislation, it is important for the DNPWC to structure these community involvement devices to ensure meaningful local support and regulation. One approach is to establish a connection between the UGCs and 30/50 funding. Absent the realistic prospect of a direct financial reward, local UGCs may be reluctant to impose meaningful resource use restraints in designated buffer zones simply for the neighboring park's benefit. Particularly innovative or protective UGCs should be assured some local reward through 30/50 funding for their efforts. In other words, the 30/50 funding should be linked, at least in part, to effective buffer zone management approaches. With this incentive, local communities interested in 30/50 funds for development should be encouraged to protect park resources in buffer zone management areas.

These incentives, however, will not always produce responsible local management of buffer zone resources. To protect against recalcitrant or unsympathetic UGCs, the park warden should have the power to review local resource management decisions.

Because buffer zone management is linked to local community involvement, villages should generally have the authority to decide for themselves (through their own processes) who should serve on the UGC. This local selection power, however, should be subject to a general representational requirement to ensure that particular groups or communities are not left out of the process. In particular, village women, who are generally responsible for firewood gathering and the like, should be represented on the UGCs.

UGC Authority and Responsibility. The BZMA provides the UGC is responsible, with the warden, for "the management of fallen trees, dry wood, firewood and grass in national parks, reserves, conservation areas or buffer zones" (Sec. 5). The statute does not otherwise specify the UGC's authority or responsibility, although it does give HMG authority to define other rights and duties, presumably through regulations. Given the delicacy of relations between park authorities and local communities in most national park areas, it is important to specify clearly what role local communities, through the UGCs, will play in buffer zone management.

The veto power issue is perhaps the most difficult issue, since retention of a veto power would give the warden ultimate authority over resource management in buffer zone areas outside park boundaries—a situation that could further exacerbate relations with neighboring communities. But failure to vest the warden with a veto power puts park ecosystems and resources at risk if local villages are intent on acting without regard for sustainability and only for short term goals.

There is no provision for local involvement in the buffer zone declaration, although the statute otherwise contemplates extensive local involvement in management of the area. ... it would be advisable for wardens to consult with local villages before designating a buffer zone area. To promote good local relations, the warden also should be required to provide a written statement of reasons why a particular area should be designated a buffer zone and allow local villagers an opportunity to comment on the proposal.

Distinguishing Ecosystem Protection and Restoration. The BZMA draws no distinction for forest management purposes between buffer zones in areas of relatively intact ecosystems and areas of degraded ecosystems. Despite some intensive cutting, the forest areas surrounding most mountain parks are still relatively intact and can probably be protected through sensitive management. But the forest areas surrounding several terai parks (particularly Royal Chitwan National Park) are seriously degraded and require extensive ecosystem restoration efforts, which will require large expenditures and a lengthy period of time. Given these two quite different situations, the DNPWC should be prepared to pursue different buffer zone management strategies to protect park resources.

Distinguishing Commercial and Individual Resource Use. The BZMA makes no distinction between commercial and individual resource use activities in designated buffer zones. Although commercial logging operations have an obvious destructive impact on forest ecosystems, the cumulative impact of numerous individual subsistence-level activities can be every bit as destructive over time as commercial activities. Moreover, both activities directly effect the availability of forest resources, thus giving local villages a stake in management decisions. While commercial forestry activities can provide local employment opportunities and otherwise stimulate local economic activity, these benefits may not outweigh the adverse impacts (environmental and otherwise) associated with large scale development.

A buffer zone management system that treats these two activities differently would risk losing local support. If the UGCs are precluded from managing commercial forest activities, then this might undermine local confidence in the UGC system, particularly if commercial activities continue unabated while the UGC is limiting individual use. By giving the UGCs some control over commercial activity, HMG conveys the message that it has confidence in local management; whereas removing commercial activities from UGC oversight would communicate the opposite message.

Tourism Infrastructure Regulation. At least since the creation of the mountain national parks, the major impact on local forest resources has been the need to meet trekker demands. To date, HMG

has not been involved in regulating trekking or tourism infrastructure development, either inside or outside the national parks. Although the Ministry of Tourism is directly responsible for trekking regulation, which includes deciding whether to open new areas, issuing trekking permits, and the like, it has not regulated the development or maintenance of trekking facilities. Indeed, throughout the government, there has been a reluctance to regulate trekking infrastructure development, perhaps because most of the actual development is occurring on private lands or perhaps because the trekking industry has brought much-needed foreign currency into the country. However, the time may be at hand for the government to begin addressing the environmental impacts of tourism.

An ever increasing number of tourists and trekkers are having an adverse environmental impact in the national parks, where tourism infrastructure development (lodges, restaurants, teahouses, etc.) is growing rapidly.... This proliferation of lodges and teahouses is stressing forest resources, both inside and outside the park. While the kerosene requirement for organized trekking groups has reduced demand for firewood from this contingent of trekkers, the growth of lodges and teahouses has fostered another contingent of trekkers who are now putting a similar pressure on local forest resources. Trees are being cut to provide timbers and wood for lodge construction, and firewood is being gathered and burned to cook food for trekkers, and to heat lodges and shower water for them. Much of this activity is occurring on lands adjacent to park boundaries, which probably should be included in a designated buffer zone.

The BZMA provides park authorities with an opportunity to begin regulating, at least indirectly, tourism and trekking infrastructure development. Since the BZMA authorizes regulation of forest resources both inside and outside the national parks, the DNPWC could use this opportunity to impose some restraints on access to timber and wood for lodge or teahouse construction and maintenance. These constraints might be linked to requirements that new lodges or teahouses meet certain location, design, and energy (or fuel) efficiency requirements.

Because the additional costs could be passed on to the tourists or trekkers and because the regulatory limitations would not apply to forest resources used for personal purposes, local villagers should see little effect on local prices. Over the long term, such an approach actually should improve facilities inside and outside the parks, further promote tourism and trekking in the region, and ensure equity among responsible lodge owners and operators.

Conclusion

The 1993 BZMA provides Nepal with a unique opportunity to

protect park resources from external threats by encouraging responsible local management of adjacent forest lands. Careful implementation of the legislation can protect shared ecosystems, promote ecosystem restoration, and meet sustainable resource management objectives. This report has attempted to explain how these goals might be best accomplished.

APPENDIX E

SUMMARY OF RESEARCH CONDUCTED BY NCRTC

Rhino Research in Bardia

Thirty eight (13 in 1986 and 25 in 1991) rhinoceros were translocated to Royal Bardia National Park from Royal Chitwan National Park. The main aim of this translocation program was to create an another viable population of rhinoceros in the similar habitat. Mr. S. R Janwali is conducting his research on Population Ecology of the Greater One-horned Rhinoceros with Particular Emphasis on Habitat Preference, Food Ecology and Ranging Behavior of a Re-introduced Population in Royal Bardia National Park. He has chosen Karnali population for his research study which were translocated in 1986. Based on progress report submitted by Mr. Shanta the preliminary results are as follows.

Population Status Age and Sex Composition of Rhinoceros Released in RBNP in 1986

Adult Males	Adult Females	Subadult Males	Subadult Females	Total
2	5	3	3	13

Of 5 translocated males 2 died with natural cause, one was poached and one is still in India. Of 8 females one died by natural cause and one is still in India with her cub. One adult male and one adult female were not located during the study period 1990/92.

Age/Sex composition of reintroduced Karnali Rhino population 1993

From Released Population		From Newly Borne Population				Total
Adult Males	Adult Females	Males	Females	Unknown Sex	Died	
2	7	2	2	2	* 2	17

*One was killed by a tiger and one was poached.

Food habits of re-introduced rhinoceros in RBNP shows that rhinoceros are mainly depend on the grass mainly sacrum species during the monsoon season (May to Sept). Whereas during dry season (Oct to April) rhinoceros are found browsing in riverain forest i.e.

Khair-Sisoo forest in the Karnali floodplain. Hence, their habitat preferences are grassland during wet season and riverain forest in dry season.

Home range of re-introduced population in Bardia is about 10 times greater than that of Chitwan population i.e. 30 Sq. Km. This is due to the scattered resources and easy assess to use these resources than in Chitwan.

Status of Re-introduced Rhinoceros in Babai Valley, RBNP

Rhino monitoring in Babai valley is more challenging; rugged mountains, rocky river beds and unavailability of elephants to this area. Thus tracking needs to be done either on foot or by floating on a raft. Soon after establishment of a NCRTC Babai camp in Chepang a team of 3 trackers from NCRTC and 2 game scouts from the Park were stationed. They were tracking rhinos on foot in a 45 km long valley camping out at nights under the trees. In the monsoon season when Babai River swells up rafting is only way to monitor rhinos. The Chief Warden had provided a raft for monitoring purposes. Trackers go out in the raft once a week from Chepang to the Babai Bridge at the Parewawodar which is 8 to 12 hours trip and covers whole valley.

From Jan, 1993 RBNP pulled out their two game scouts for anti poaching unit because threat of poaching has increased in Babai Valley. Two game scouts from RBNP have been stationed in Guthi. As a result NCRTC has less manpower for tracking rhinos in Babai Valley. Thus, Senior Wildlife Technician from Betani Camp has been transferred to Babai Station to carry on the monitoring work more effectively. NCRTC officers had frequently reported to Member Secretary for the difficulty of rhino monitoring work in Babai and associated risk on it. Unfortunately, one very hard working tracker Mr. Dhan Bir Tharu had killed by an rhino attack when he and Gyan B. Rana, another tracker were in regular monitoring in Dhanuse about 12 Km west from Chepang station.

After this fatal accident rhino monitoring work became more challenging and tough. The trackers were not ready to go very far due to the higher risk of physical injury and even death. Soon after the death of Dhanbir NCRTC officers and trackers held meeting in Chepang and decided that not to go very far from the camp area. Therefore, tracking rhino is only concentrated on the area of 5 Km radius around the Babai station.

Due to the complex situation the rhino monitoring data is not reliable for any scientific study. However, the trackers are monitoring rhinos by the observation which can only shows the presence of rhino in Babai Valley and their reproduction status.

Current Status of Rhinos in Babai Valley

Of 25 re-introduced rhinos in Babai Valley two (one adult male and one adult female) have been poached. One newly borne calf was found dead. The cause of death may be drowning into the water while he was crossing the Babai river and trapped into the stone. Thus, based on the previous year's data and recent observations it can be said that there are 23 adult and 4 new calves in the Babai Valley.

Sloth Bear Study

The sloth bear project was initiated in 1991 by Anup R. Joshi in Royal Chitwan National Park to study the Factors limiting the Abundance and Distribution of Sloth Bears in Lowlands of Nepal as his Ph. D project wiht the University of Minnesota.

The preliminary results for the sloth bear study are as follows:

* Home range sizes of the male bears are larger than those of females i.e. 18.4 Sq Km and 9.5 Sq. Km respectively. In monsoon (May - Nov) home range size of sloth bears are larger than dry season (Dec - Apr.) because in dry season they concentrate in grasslands to feed on under ground termites nest. But in monsoon season half of the bears moved into the upland Sal forest resulting bigger home range. Home range of both male and female bears heavily overlap with one another. The sloth bears don't seem defend their territory.

* Sloth bears are well known to fed ants and termites, and in some season they eat fruit. However, it is unclear whether both insects and fruit are necessary to sustain a bear population. It is a vital question whether bear abundance is related to a diverse mosaic of habitats providing year around supply of fruits, or alternatively a reflection of the availability of ants and termites when fruit abundance is low. To answer that question Scat analysis of sloth bears from October, 1991 to July, 1992 (N=427) shows that insects (termites and ants) are the major component of the sloth bear diet. Over 90 % of diet between October and April comprised of insect materials. In the monsoon season when grasslands were water logged sloth bear lost their asses to the under ground termite and ant nests. At this time they were sen to break above ground termite hills. Plenty of fruits were available in the riverain forest during May through August but scat analysis shows 38% - 50 % of fruits in this period, still termites remain as a major component of the diet.

The final results of the study is expected to come out in second half of 1994.

Other Research Activities

Bird Population Monitoring: by distributing data sheets to naturalists.

Migratory Water Bird Survey

Jointly initiated by RCNP and NCRTC. Survey has been conducted in Rapti and Narayani rivers once a month January through March 1993. The different species of birds seen in different habitats along with the group size has been noted.

Ungulate Monitoring

This is done by the transect count method, our wildlife technicians go for every month for five days to cont ungulates along the two previously set transact no. 1 and 17. The collected data will be used for the researchers as a base line data for their further study.

Carnivore Monitoring

This is done through the track count methods. Every week along the river bank and along the road early in the morning one of our technicians go for counting track of the carnivores. The measurements of the track (length, width, diameter etc.) are being recorded to know the movement of the carnivores in the park.

Bird Transect

Every two weeks the technicians go for the bird transect count. They have a data sheet for recording the bird numbers, habitat, activities and the status. This is done along the transact 1 & 17.

Habitat Management

- Nandan tal Restoration
- Dam Construction in Lami Tal

Treatment for Wounded Rhino

Two wounded rhinos in Tikauli & Parsa W/F Reserve have been treated by joint initiation of NCRTC technicians and RCNP staff. In 27 May 1993 one wounded adult male rhino has been treated in Raj Ghol north of Tikauli. Another adult male treated on 24 May 1993 in Rambhari Bhatta, Parsa W/F Reserve, who was wounded by poacher attack by firing 6 round of bullet.

A Man eater Captured

A three years old sub adult male man eater tiger was captured on 30 May 1993 in Muna tal west from Kashara by the effort of NCRTC wildlife technicians and RCNP and Tiger Tops staff. The captured tiger has moved to the Jawalakhel zoo for the safety of the people.

Community Development Program

Nursery

NCRTC has established one nursery in Bachhauli and provided support for Janakpur nursery in Kumroj. NCRTC also has a small nursery in its office premises. Since plantation activity is being increased now NCRTC has capacity to produce 300,000 saplings per year. From the total cost of previous year's expenses the production cost of 1 saplings is about NRs. 1.18

Saplings Production Details up to 1992/93

FY	Total Sap. Produced	Used for Plantation	Sold by Cash	Free Dist	Balance
1988/89	31,360	-	13,506	15,123	2,731
1989/90	101,652	81,517	549	14,930	4,656
1990/91	110,378	56,916	11,700	40,000	1,762
1991/92	117,833	57,917	19,775	35,538	4,623
1992/93	243,316	116,217	12,000	50,000	65,099

Six plantation of about 172 ha has been established by the support from various donor agencies.

Registration of Jankauli community forest

District Forest Officer Mr. D. J shah has handed over Jankauli Community Plantation area of 97 Ha. to the local users. Of 97ha. 42 ha. has already planted and remaining will be planted at subsequent years.

Benefits from these Plantation

* Regular grass cutting facilities and fodder supply
* Reduction of illegal entry into the park
* Less time for collecting fodder
* Community' own resources
* Total 775 households and their 2761 cattle and 1368 goats are getting direct benefit from the plantation sites
* No risk of injury by wild animal attack
* Wise use of highly degraded land
* Environmental Protection
* Soil erosion control
* Bio-diversity conservation

* New habitat for wildlife
* Local development by selling forest product from plantation sites
* Buffer Zone for RCNP
* Jankauli III plot 22 ha. was planned for this year's plantation. But due to the flood on July and August Jankauli plantation has been postponed for next year.

Plantation details up to FY 1992/93

Location	Area ha.	No. of Saplings	Success Rate	Amount	Donor	Year
Baghmara I	32	81,517	90 %	158,985	A	1989
BaghmaraII	20	56,916	95 %	167,350	A	1990
Total	52		92.5 %			

A = WWF-US/USAID/RCNP

Training Program

Refresher Nature Guide Training

About 60 previously trained local guides are given one week refresher nature guide training on 12 - 19 July, 1993. The entire training session was divided into two shifts. The main aim of this training program was to provide up dated information of Royal Chitwan National Park and its new polices for tourism management. The Warden at Sauraha, Lecturer from TU, Botanist & OIC, NCRTC have given lectures in relevant field. A field trip was organized to Balmiki Asram western boarder of RCNP to provide knowledge on cultural heritage of RCNP. At the end of the training session a seminar was organized which was to be presented by the participants to reflect their knowledge during the training session.

Game Scouts Training in Bardia

Twenty five game scouts from almost all national parks and reserves were provided historical training in the premises of Royal Bardia National Park. The major goal of the training was to provide knowledge on parks rule and regulations for the game scouts (lower

level conservation workers). Besides this they were provided training on various ecological, management and park patrolling procedures.

Training on Radio Telemetry and Research Exercise

Three Groups of certificate level and one group of diploma level students from Institute of Forestry, have joined the course as a part of their regular curriculum.

Ecological Research Training for Graduate Students from Tribhuvan University

Two masters level students from Tribhuvan University from have conducted their Masters level research on Scat Analysis of Sloth Bar and Home Range of Sloth Bear.

Community Awareness Program

Workshop on Vegetable Farming and Management

Two days workshop on vegetable farming and management was held at the premises of NCRTC, Sauraha. The workshop was designed to educate farmers on growing vegetables in summer season. The workshop provided insight on soil preparation, use of pesticides and fertilizers and the probable disease and their prevention and control.

Workshop on Community Plantation

A one day workshop on community plantation was held at the premises of NCRTC. The aim of this workshop is to make local people aware of community plantation. The workshop provided knowledge on process of plantation, legal procedure, formation of users group committee and management of plantation sites to the participants. Warden at Sauraha, officers from DFO office gave lectures on the above fields. Discussion was held between old and new user's group to exchange ideas regarding community plantation and its importance to the local community.

APPENDIX F

TOURISM IN NEPAL

While the negative environmental impacts associated with tourists have not been quantified in most areas, their effects were visibly evident in Chitwan. Controlling tourist flows does not fall within the purview of the DNPWC, but is rather a function of the Department of Immigration. Cooperation with the Ministry of Tourism has not been productive because of the conflicting institutional interests with Tourism geared to maximizing revenues and responding to private operators' interests. In contrast, DNPWC's mandate specifies that tourism promotion is to remain secondary to conservation objectives. The failure to date of "green" tourism despite regulatory changes and conservation education programs is symptomatic. Prior to the BZMA, the park service had no authority to work outside the park to integrate tourist facilities into the overall planning process. Even with the ammendment many issues of institutional responsibility remain unclear (see Appendix G).

The new Buffer Zone Management Act of 1993 provides the legal basis for an evolving policy in Nepal which seeks to link successful park management with development in the peripheral areas surrounding the country's national parks, reserves, and conservation areas. The Act provides a forum in which the tradeoffs between conservation and economic growth can be reconciled while respecting well-defined guidelines. These guidelines formally recognize the rights and sometimes competing needs of surounding populations in using the resources in and around parks thereby recognizing an undeniable vested interest of such groups in any viable model of park management. The approach persues a "win-win" scenario in which conservation objectives are tied to new sources of revenue for local populations, incentives to adopt ecologically sound land use practices, and distribution of park revenues beyond park borders.

Tourism will contribute the largest percentage of the revenues that will be distributed under this new legislation. It is imperative then to establish clear linkages between the source and distribution of these revenues and the regulations needed to maintain the park. While the new mechanisms to distribute park revenues should lead to a more equitable balancing of tradeoffs and benefits for all interests, the current situation still juxtaposes tourists and the local populations as competing stakeholder groups. Awareness programs aimed at local populations as well as those geared to visitors, coupled with the influx of revenue and employment have brought tourist, park management, and local interests closer to acceptable trade-offs for each group, but the results of a mini-survey of hotel owners indicates that at least from one group's perspective, much work remains to be done. Table D-1 summarizes the survey findings.

F-2

Table F-1

Interviews with Hotel Owners

Information	Wendy's Lodge	Tiger Camp	Hotel Jungle Camp	Chitwan Jungle Lodge	Temple Tiger
Number of Beds Rate per night	20 US$30	30 US$20	32 US$25	64 US$80	40 US$150
Most frequently asked question by tourists	Programs, facilities and foods at lodge	Wildlife, plants, local cultures and safety	Tharu culture, malaria, tigers and rhinos	Will they see tigers, rhinos and birds	Facilities and wildlife viewing
Programs to educate tourists	Park briefing, sight seeing and history	Slide show on RCNP and local cultures	Briefing on proper code of conduct within park	Nature walks, slide show and wildlife talk	Park briefing and talk about elephants and Tharu culture
Hotel's impact on park	Number of people now exceed number of animals in park	Increased demand for wood for fuel and construction	Competition leads to cheap and environmentally damaging hotels	Help patrol for rhino traps and other illegal activities	Overall negative impact on surrounding area
Tourist impact on vegetation	Trails and heavy use of elephants	Smuggling of fuelwood	Paths created by tourists	Visible impact on forest, especially its clearing	Human use of collection of fodder is thinning forest
Tourist impact on wildlife	Wildlife has been frightened from vicinity	Moths, butterflies and other insects are collected	Guides often harass animals for better viewing	Wildlife frequently disturbed	Wildlife frequently disturbed
Tourist impact on areas outside park	Rural environment giving way to town buildings. Much garbage evident	More jobs available	Neighboring forests have been cut due to increased demand for wood	More jobs available	More jobs available
Opportunities for RCNP and Hotel owners to work together	Sharing of park revenue. Outside hotels should be permitted to use elephants	Hotels could monitor impact of tourist activity and learn about tourists' interests	The exchange of ideas for better tourism management	No information available	Share in upkeep of park roads. Also, tourist impressions of park should be studied
Experience with Anti poaching unit	Units seen as worthwhile	Unaware of units	Hotels and units should join forces	Would pay informants to help units	Units have worked hard, yet poaching has increased
Experiences with Nepalese Army	Seen as ineffective	Seen as ineffective	Patrols are seen as predictable and not serious	Army is doing a better job than rangers	Army is not seriously interested in its work
Experiences with Mahendra Trust	Work in community development and forestry is well known	Provides good environmental information although Trust's involvement within park is unknown	Work has increased public awareness about conservation and the park	Work is not well known	Seems that Trust is not interested in park management
Sources of hotel owners' environmental education	Tourism association	Self-taught	Self-taught	Self-taught	From tourists and conservationists
Improving tourism guidelines	Number of hotels and tourists should be restricted	Use of generators and loud music should be controlled	Improved transportation of tourists and vehicles	Formally trained naturalists needed	Ban on camping within the park

The following notes provide additional detail to accompany the information contained in Table D-1. They derive from a summary of interviews with senior employees of the hotels and lodges in RCNP

Managers, Marketing Directors, Owners and Naturalists of five hotels and lodges, three in Saurah and two concessionaires inside RCMP, were interviewed to learn about the tourism industry and its impact on RCNP. The capacity of the hotels was from 20 bed to 64 beds and the price per night ranged from US$20 outside the park to US$150 inside RCNP.

1. The most frequently asked question by tourists were about wildlife, vegetation, local culture, malaria and safety precautions. They liked to confirm programs in package tours, facilities in the lodge and available foods. Other inquiries included wildlife viewing opportunities, rhino and tiger populations, and park ecology.

2. The programs to educate tourists by the hotels include briefing on the park, its location, history, animals, vegetation and local culture. Some hotels have welcome and introduction programs and some have slide shows and lectures about elephants and other attractions.

3. About the hotels' influence on the park, the interviewees replied that now there are more visitors than tigers and rhinos in the park. It has been overcrowded. Untrained guides without environmental education are acting the detrimental ways such as pushing rhinos into open areas by shouting and throwing objects to make please the tourists. Hotels, knowingly or unknowingly, use park resources, which helps the local economy but harms the park ecology. Vehicle pollution and littering also area associated with tourism. On the positive side, the lodges inside the park help rangers and the army in patrolling the area by providing transportation, including elephants. The also help to keep track of rhinos and other animals and rhino traps.

4. The tourist business has negative impacts on vegetation. The heavy use of elephants for tourists and the trails made four nature walks have harmed vegetation. Outside the park, the hotels use firewood and timber smuggled for. sale by the local people. Inside RCNP, the forest clearing for infrastructure, profuse firewood use for heating and cooking, and timber exploitation for construction have been detrimental to the neighboring forests. Fodder collection for elephants also has destroyed parts of the forest.

5. Not all the hotels are concerned enough about the proper disposal of septic tanks, kitchen and toilet waters. Latrines and toilets are directly discharged in the river. In Sauraha, plastic bottles, plastic bags and papers are seen commonly scattered. Tourism has

helped to generate economic opportunities, but in the meantime, cultural pollution, environmental pollution, disease contamination, price inflation, increasing use of drugs by local youths have accompanied the tourist industry.

6. Concerning the question about RCNP involvement with hotel owners to become better partners in managing the park, owners asked regular flow of information about tourist impact and the impact of hotels and local people on RCNP with suggestions and mutually discussed programs. The like to know confirmed statistics on animal population and research data for visitors' information. They requested population and research data for visitors' information. They requested for park road to be better maintained and to meet the tourist trade need with ease. Visitors' opinions also should be considered by the park managers.

7. Wild animals have been distrubed and frightened by tourist activities. Because animals tend to shy away from trails, animal sightings are more difficult and harass for better viewing is increasing. Insects, butterflies, and moths are directly exploited by the tourist collectors and in the process rare and endangered species have been affected. Interference to wildlife activities and disturbances to wildlife ecology are becoming common features in RCNP.

8. The anti-poaching units are worthwhile and have done a good job. In this unit, hotel people local people and park people should work together to make it more effective. The hotel association of Saurah and the concessionaires are willing to support the unit and pay rewards to informants.

9. The general view regarding the Royal Nepalese Army is that it is not as effective at protecting the park as expected, through their presence is necessary for deterring the worst effects of poaching. The units are blamed for not taking seriously the interest in work for which they are charged. Even officers do not take initiative in their work. It has been suggested that the timing and areas of patrolling should be changed to increase the chances of ambushing poachers.

10. Local people are happy with the King Mahendra Trust for Nature Conservation activities because they contribute to local development and community forestry programs. The KMTNC provides good environmental information but its interest to help park management is not very well known.

11. Concerning the necessary control and regulations in developing a desirable destination for tourists, the interviewees suggested better controlling garbage and noise (generators and music) and pollution in Saurah. The regulations to employ trained naturalists by hotels should be mandatory. The number of hotels in Saurah should be controlled and the entry of the tourists into the park

also should be limited. Illegal entry into the park should be checked. Camping inside the park should be stopped. All the concessionaires from the park should be asked to move and operate from outside the park (suggested by hote respondants whose faciltities were outside the park). An administrative unit is necessary to authorize development and implement regulations to keep environment healthy and clean in Saurah.

APPENDIX G

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