

# What strategies are effective for Nepal's rhino conservation: a recent case study

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## Abstract

The huge increase in rhino poaching from mid-1998 to mid-2000 in the Chitwan Valley of Nepal was due partly to the slackness and ineffective leadership of one of the chief wardens, and the lack of a full-time experienced and competent senior officer in the valley to supervise the anti-poaching activities. To the credit of the Parks Department, some officers realized what had gone wrong and compiled a report detailing park deficiencies. It was circulated to interested parties at the end of 1999 and early 2000. Unfortunately, by then at least 20 rhinos had been killed illegally in 1998 and 1999. Soon after this report was issued, a highly competent officer was appointed to supervise the anti-poaching activities, and later in the year an experienced and forceful chief warden was put into position. From mid-2000 to early February 2001 only one rhino was poached as far as is known. This incident highlights the importance of a single person or at most two in successful rhino protection.

## Résumé

L'augmentation énorme du braconnage des rhinos entre le milieu de 1998 et le milieu de 2000 dans la Chitwan Valley, au Népal, était due en partie à la négligence et à l'inefficacité d'un des conservateurs en chef et aussi à l'absence d'un responsable expérimenté et compétent travaillant à plein temps dans la vallée pour superviser les activités anti-braconnage. On peut mettre au crédit du département des Parcs le fait que certains responsables ont identifié ce qui était en cause et rédigé un rapport détaillant toutes les déficiences du parc. Ce rapport a circulé chez toutes les parties concernées fin 1999 et début 2000. Malheureusement, à cette date, au moins 20 rhinos avaient déjà été illégalement tués en 1998 et 1999. Peu après la parution de ce rapport, on a nommé un responsable extrêmement compétent pour superviser les activités anti-braconnage et, plus tard dans la même année, un conservateur en chef expérimenté et énergique fut mis en place. Entre le milieu de 2000 et le début de février 2001, un seul rhino a été braconné à notre connaissance. Cet incident souligne l'importance que peuvent avoir une ou deux personnes seulement, dans la réussite de la conservation des rhinos.

## Introduction

Over the past three decades, the Department of National Parks and Wildlife Conservation (DNPWC) in Nepal has implemented one of the most successful programmes in the world for conserving rhinos (Martin and Vigne 1995). In 1968, there were an estimated 95 greater one-horned rhinos in Nepal, but by 2000, when the most recent census was carried out, numbers had increased to 612 (DNPWC 2000). However, from mid-1998 to mid-2000, Royal Chitwan National Park and the surrounding areas, which harboured 89% of the country's rhinos, experienced the worst poaching for any two-year period since the park was established in 1973. On the other hand, the rhinos in the

Royal Bardia National Park have remained secure.

Reasons for this sudden increase in illegal killings of rhinos in Royal Chitwan National Park are examined and recommendations are presented that could reduce the chances of another upsurge in poaching in the future.

The fieldwork for this project was carried out in a three-week period in February 2001.

## Rhinos poached in the Chitwan Valley, mid-1998 to mid-2000

From 1994 to 1997 the average number of rhinos illegally killed each year in the Chitwan Valley (Royal Chitwan National Park and surrounding areas) was

under two a year (Martin 1998). However, poaching began to escalate in mid-1998. From July 1998 to October 1999 at least 19 rhinos were poached in the valley and another 15 were illegally killed from November 1999 to August 2000 (see table 1). These poaching statistics are the minimum figures, as several additional rhino carcasses were found too late to diagnose the cause of death.

Several other sets of poaching data exist. For example, the figure given in the DNPWC annual reports of 1998/1999 and 1999/2000 for the period from July 1998 to October 1999 is 12 (Subba 2000, 2001). Tika Ram Adhikari, who is the team leader of the anti-poaching units in the Chitwan Valley and the acting chief warden of Parsa Wildlife Reserve, believes, however, that there were 19.

From November 1999 to July 2000 the figure given in the annual report is 11; Adhikari's count is 13, which is quite close to the official figure. From late 1999 to early 2001, the veterinarians, especially Jacques Flamand of the Wildlife and Domestic Veterinary Programme of Royal Chitwan National Park, have examined most of the rhino carcasses in and around the park. Judging from the autopsies they performed, they believe that from November 1999 to August 2000 at least 15 rhinos were illegally killed (Flamand 2000), which tallies with Adhikari's counts.

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This 3-month-old male rhino, attacked by a tiger 15 days before this picture was taken, is being hand reared at Royal Chitwan National Park headquarters.

Using the statistics from the DNPWC annual reports for 1998/1999 and 1999/2000 (Subba 2000, 2001), we can determine that from mid-1998 to July 2000, 55% of the rhinos poached were outside the park. From mid-1999 to July 2000, however, the percentage of rhinos poached outside the park rose to 65. This is significant when we analyse the causes of poaching, because the government organizations responsible for patrolling inside the park are different from those patrolling outside it.

## Poaching methods in the Chitwan Valley

Poachers in the Chitwan Valley use six main methods to kill rhinos: shooting with firearms, pit trapping, spearing, snaring, poisoning and electrocuting.

During 1999 and 2000, the most common method was with firearms, usually musket or rifle. Some of these arms are locally made, others factory-produced. Generally the gangs, which number two to five men armed with three guns, are from outside the park. One or two local people from the buffer zone are recruited as they are familiar

Table 1. Minimum number of rhinos poached in the Chitwan Valley, mid-July 1998 to early 2001

Time period	Number illegally killed
July 1998 to October 1999	19
November 1999 to August 2000	15
September 2000 to early February 2001	1
Total	<u>35</u>
1998 and 1999	20
2000	15
Total	35

Source: Tika Ram Adhikari, acting chief warden, Parsa Wildlife Reserve and team leader for the anti-poaching units in the Chitwan Valley (data collected for 1998 and 1999), and Jacques Flamand, Zoological Society of London, senior veterinary adviser in Chitwan (data collected for 2000 and early 2001)

with the topography of the park and the surrounding zone. Park staff believe that some former army personnel have recently been hired by the gangs, and one soldier retired from the Indian army is involved in the actual shooting. The poaching gangs usually enter the northern park boundary (where most of the rhinos are located) or the surrounding areas in the evenings when the army is not patrolling, and they depart at night or early in the morning, when they are least likely to be detected.

The gang size for pit trapping is large, as people are needed to construct the big rectangular pits and to cover them with sticks and other vegetation for camouflage; some of these gangs may number up to 15.

Spearing is rather ineffective because often the animal does not die immediately and the authorities find the carcass before the hunters have had a chance to remove the horn, hooves and other body parts. For example, in 1999 one adult male rhino was speared inside the Baghmara Community Forest close to the park, but the wounded animal left the forest and wandered into the elephant breeding centre near the tourist centre of Sauraha, preventing the hunters from taking the valuable horn.

Another method for killing rhinos, which is also not very efficient, is snaring. Most of the snares are put down for deer, but they are occasionally set for rhinos as well. Nylon, rope and wire have been found around the necks and legs of rhinos. Sometimes it takes many days for a snared rhino to die, usually

from infection, and by that time, the army or park authorities may have discovered the carcass.

Poisoning has become common. In 1999 more than nine rhinos were poisoned in the Chitwan Valley. The poisons used are chlorinated hydrocarbons of the DDT family, widely used in southern Nepal for crop spraying (Jacques Flamand, pers. comm. 2001). The poisons specifically used for rhinos are put into oranges and pumpkins on the edge of Chitwan Park; they take on average from three to eight hours to kill the animals.

Villagers in southern Nepal have been stringing wire cables (usually two) about one metre above the ground and connecting them to the village power supply to electrocute bears, deer and wild boars. Occasionally rhinos run into the wires. This accidental killing of rhinos by electrocution started in 1997 in Nawalparasi District, and since then at least four rhinos have been killed in this way.

## The trade in rhino products

When a rhino is illegally killed in the Chitwan Valley, it is usually organized by a trader, who wants the animal primarily for its horn. Sometimes the hooves and occasionally pieces of skin are also removed. But by far the most valuable part of the rhino is the horn. In 2000 a poaching gang in the Chitwan Valley might have received up to 300,000 Nepalese rupees (NPR) or USD 4253 for a horn weighing on average 722 g (Martin 1983), which works out to NPR 415,512 (USD 5894) for 1 kg. The first middleman is usually located in a village in the valley. He sells the horn by weight to another trader (the second middleman), who usually lives in a town such as Kathmandu, Pokhara, Nepalganj or Narayangadh. This trader, who may or may not be an exporter, sells the horn for NPR 90,000–100,000 (USD 1277–1418) per 100 g (T.R. Adhikari, pers. comm. 2001).

In mid-2000, the main buyer of rhino horn in the valley at that time was arrested. He had also organized illegal gangs and sometimes poached himself. He was transporting a rhino horn from



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The best way to see rhinos in Nepal is from the back of an elephant.

Tikauli (just north of Chitwan Park) on a bus to Narayangadh town on his way to Kathmandu to sell it to a main dealer, a Mr X, for whom he was an accomplice. After his arrest he helped the authorities track down Mr X and accompanied park staff to Kathmandu where, with the assistance of the police and the Forest Department, Mr X was arrested in late July 2000. This was the first time that the authorities caught a major rhino horn dealer. The Kathmandu trader later talked to Tika Ram Adhikari about his dealings. He admitted to selling six rhino horns, but the Park staff believe he sold 11. He sold his horns, at the prices given above, allegedly to a Chinese woman employed in the Chinese embassy in Kathmandu, who is fluent in Nepalese, Tibetan, Mandarin and English. Adhikari thinks she has been exporting horns since 1990. Besides these horns, she also allegedly buys tiger bones and other medicinal products and sends them by road, first to the border town of Tatopani, then on to Lhasa in Tibet, and finally to China.

Mr X, formerly a managing director of a charcoal company, is a businessman from the Manange ethnic group. Originating north of Annapurna, this group has a recent tradition of organizing dubious schemes with businessmen in Singapore, Bangkok and Hong Kong to import gold, clothes and electronic goods. He started buying horn around 1990, mostly from his Chitwan Valley accomplice mentioned earlier. He is prosperous and presents himself as benevolent by helping flood victims and donating to monasteries. He is now in Bharatpur Prison with five major counts against him (Gopal Prasad Upadhyay, chief warden of Royal Chitwan National Park, and Dhubra Acharya, DFO Kathmandu, pers. comm. 2001). Besides Mr X and the Chinese woman, who buys horns from him, three other known main dealers in rhino horn are based or partly based in Kathmandu. One is a Tibetan who buys rhino horns, tiger bones, rare herbs and gemstones in Nepal. He speaks only Tibetan so he works closely with the multilingual Chinese woman in exporting rhino horns from Nepal to Lhasa and beyond. Especially from 1991 to 1994, an-

other Manange, who is a former British Gurkha officer, was involved in buying rhino horns and is still active today. The third, also a Manange, is a relative of Mr X, with whom he works. He is a proprietor of a guest house in Kathmandu, and he buys rhino horns and tiger bones.

### Reasons for the increase in poaching in the Chitwan Valley from mid-1998 to mid-2000

There was no single cause for the major increase in rhino poaching in the Chitwan Valley from 1998 to 2000, but one factor was overriding: mismanagement. First, in the middle and late 1990s, there were four transfers of chief wardens in Chitwan Park involving three people. The continuity of management suffers from rapid changeover such as this.

Second, one of the chief wardens was not effective enough, as he sometimes procrastinated in making decisions. In addition, he did not coordinate well the activities of the five groups of people responsible for protecting the rhino. These groups are the regular staff of 277, the army, the rhino anti-poaching units, the DFOs (district forest officers) and the non-governmental organizations (NGOs). He did not communicate adequately with the commander of the army stationed inside the park. (Most of the rhino anti-



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Just north of Royal Chitwan National Park, a Nepali villager prepares reeds that he collected legally inside the park for his house. The cutting season has been reduced from 15 days to 7 days each year.



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was that the anti-poaching units were not as active as they should have been as they were not well supervised by one of the chief wardens. The result was that they were not as mobile as they should have been and did not patrol intensively enough.

Another main reason for a rise in rhino poaching was financial difficulties. The anti-poaching units and Chitwan Park's other personnel lacked adequate resources. The senior staff of DNPWC, aware of these problems, issued a report in December 1999 stating: 'APU staff are not well equipped. The informants are not adequate in number. Anti-poaching units are very weak because [of] lack of effective intelligence system,

It is not uncommon to see rhinos in Royal Chitwan National Park eating dung as shown here.

poaching activities in Chitwan Park are carried out by an army battalion of about 800 men who are well armed; none of the park staff carries firearms.) Nor did he deal well with his anti-poaching units, five of which are based inside the park, two in Parsa Wildlife Reserve and three in the surrounding national forests located in the buffer zone. This chief warden did not have close relations with DFOs in Chitwan, Nawalparasi or Makwanpur Districts, where the rhinos are found. This lack of strong coordination with these DFOs was especially regrettable as over half the rhinos poached in 1998, 1999 and 2000 were killed in these districts. Neither did this chief warden cooperate closely enough with the NGO community such as WWF Nepal, which helps support the anti-poaching units; the King Mahendra Trust, which carries out training programmes and supports research projects; and the International Trust for Nature Conservation (ITNC), which provides most of the reward money for helping to arrest poachers and traders. Previous chief wardens, who had kept poaching at low levels (except in 1992), all had excellent, strong working relations with all these organizations. The chief warden's role in coordinating all the groups involved in rhino protection is essential for successful rhino conservation.

A third factor contributing to the mismanagement

field gear, proper training, supervision, guidance, coordination, transportation and weapons...' (Adhikari et al. 1999). The report also confirmed that 'joint patrolling of APU's staff and armed forest guard has not been developed in the Chitwan Valley due to lack of proper coordination mechanism between the park warden and DFOs' (Adhikari et al. 1999).

A further cause of the poaching was that the main buyer of rhino horn in the valley in the late 1990s was not arrested until mid-2000. The main trader in Kathmandu, Mr X, continued buying rhino horn until his arrest in late July 2000.

Also, from 1996 to around 2000, perhaps 60% of the rhino poachers were supported by political party leaders, making it more difficult to apprehend and jail them.

A final cause for more poaching in the late 1990s, as DNPWC director general Tirtha Maskey and others believe that because of a surplus of rhinos in certain northern areas of the park there has not only been more infighting among males, sometimes resulting in death, but also some have wandered out of the park, making it easier for hunters to poach them.

Finally in late 2000, a former chief warden, Gopal Prasad Upadhyay, who was well respected and a good leader, was moved back into the position of chief warden of the park. In the same year, the former as-

sistant warden, Tika Ram Adhikari, who was in charge of anti-poaching activities in and around Chitwan Park, returned, this time as team leader of the anti-poaching units of the Chitwan Valley.

## Decline in poaching in the Chitwan Valley from mid-2000

With the reappointments of Upadhyay as chief warden and Adhikari as the anti-poaching team leader, rhino poaching in the valley ceased almost totally from August 2000 to early February 2001, when these data were collected. The last known rhino-poaching incident occurred outside the park, when a rhino wounded by a bullet took three months before it finally succumbed and died in the national forest in November 2000.

Since the major threat to rhinos was outside the park, where the army has no jurisdiction, a major effort was put into reinvigorating the anti-poaching units working there. Adhikari showed strong leadership and personally spent 10 days each month in the field supervising anti-poaching strategies. To complement the anti-poaching units, which do not possess guns, 54 armed forest guards with .303 rifles were employed from around December 1999 to patrol the areas outside the park. One four-wheel-drive vehicle and one motorbike were obtained to improve logistics.

Perhaps the most important component of any successful anti-poaching campaign is intelligence, which was greatly improved. Besides the intelligence officers attached to the anti-poaching units, the user committees that help run the 750-km<sup>2</sup> buffer zone on the edge of Chitwan Park provided five informers. Thus the total number of informers in and around the park is now 17, 6 paid by ITNC, 6 by WWF Nepal and 5 by the user committees. ITNC, which raises funds from tourists at Tiger Tops Jungle Lodge, continued to allocate considerable sums of reward money. It donated NPR 295,000 (USD 4184) of reward money in 2000 to the chief warden, which led to the arrest of many poachers in the Chitwan Valley (Marcus

Cotton, general manager, Tiger Tops Jungle Lodge, Chitwan, pers. comm. 2001). From January 2000 to early February 2001, 28 rhino poachers, 4 leopard poachers (the bones are sold for only USD 14/kg) and 4 people in possession of fake rhino horns (made from wood) were arrested (Adhikari, pers. comm. 2001). A man was also arrested for creeping around the park in the early mornings photographing rhinos, presumably to identify those with the largest horns for the poaching gangs.

To improve further the coordination of those involved in anti-poaching, monthly meetings were set up with the army, the Forest Department, the Parks Department and the police. This greater cooperation increased the efficiency of conserving the rhinos.

In addition, the political support that the poaching gangs and traders used to get from some of the political parties has now decreased. Senior park staff have convinced the politicians that this former policy was not in their interest.

## Excellent protection of rhinos in Royal Bardia National Park

Between 1994 and 2000 not one rhino was illegally killed inside Royal Bardia National Park, although

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Baghmara Community Forest, part of the buffer zone to Royal Chitwan National Park and covering 400 hectares, raised USD 74,000 for the financial year 1999/2000, almost all from tourism.



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There were 492 rhinos in Royal Chitwan National Park and 52 in the buffer zone in 2000, an increase of 3.88% per year since 1994.

two were poached outside it—one in 1998 and one in November 2000 in the buffer zone, the last known rhino to be illegally killed. Using a home-made gun, the poacher fired a bullet into the rhino; however, the animal did not die instantly but first travelled several kilometres. When it died and the four poachers in the gang started to chop off the horn with an axe, they were discovered by several villagers, who reported the incident to the

park authorities. Army and park staff immediately went to the site and were able to collect the full horn as the poachers had fled.

From 1994 to 2000, hunters have been unsuccessful at poaching rhinos in Bardia Park, compared with Chitwan Park, for several reasons. There are fewer rhinos in Bardia; in the year 2000 there were 67 rhinos in the 968 km<sup>2</sup> of Bardia Park compared with 492 rhinos in Chitwan, which is approximately the same size (see table 2). Most of the Bardia rhinos are located in the Babai Valley, a remote and inaccessible part of the park, whereas in Chitwan they are usually found along the river close to human habitation. In addition, far fewer people live around Bardia (about

70,000) than Chitwan (about 242,000 in the buffer zone alone) according to DNPWC (1999). Rhinos have been in the Chitwan Valley for thousands of years but were eliminated in the Bardia area many decades ago and were not brought back until the translocations from Chitwan commenced in 1986 (13 rhinos in 1986, 25 in 1991, 4 in 1999 and 16 in 2000). Thus, there is no long tradition of rhino poachers and middlemen around Bardia. From 1986 to 1993, eight rhinos have been poached, six in and two outside the park.

Before the buffer zone was set up around Bardia in 1997, the forests outside the park were fairly large compared with those

Table 2. Number of rhinos in Nepal, April 2000 census and 1994 count

Location	April 2000 census	1994 count
Chitwan Valley <sup>a</sup>		
Inside park	492	411
In buffer zone	52	29
Total	544	440
Royal Bardia National Park	67	—
Royal Suklaphanta Wildlife Reserve	1	—
Total for Nepal	612	—

Source: DNPWC 2000

<sup>a</sup> Growth rate of the Chitwan Valley population from 1994 to 2000: 3.88% per annum

surrounding Chitwan, and they offered the local people ample supplies of wood, thatch and other materials, and adequate grazing for their livestock. Thus, the incentive to enter Bardia Park to hunt for a small, isolated population of rhinos for economic gain was slight.

Perhaps the most important factor for the recent reduction of rhino poaching in and around Bardia Park is because a well-thought-out rhino anti-poaching strategy has been implemented and managed. There are five anti-poaching units which patrol inside the park and each unit employs one informer who moves around the villages outside the park gathering information on possible poachers and middlemen.

Other informers are also working in the villages, gathering information for Bardia's chief warden. In 2000, for example, 11 rhino poachers were apprehended because of information that informers supplied. One of the poachers admitted that between 1991 and 1993 he shot several rhinos with a home-made gun and sold the horns for NPR 100,000 to 200,000 (the equivalent of USD 3144 to 6287/kg) to a trader from Nepalganj town (Shiv Raj Bhatta, manager of the Bardia Integrated Conservation Project, pers. comm. 2001). The actual poaching gang consisted of about six people who came from Taratal village outside the buffer zone to the south of the park.

The Bardia anti-poaching units are well trained, disciplined and effectively led. WWF Nepal has provided them with communication sets, transport facilities and other equipment such as camping gear. The informers have also received financial rewards from ITNC. All these extra benefits from the NGOs have notably increased the motivation of the men in these units, which in turn has greatly increased their effectiveness.

As a further incentive to improve the efficiency of the guard posts inside Bardia, each month one or more guards receives a reward of NPR 1000 (USD 13.80) in early 2001 for outstanding service. A third factor of the anti-poaching strategy is the method of patrolling. Park authorities have developed what they call 'sweeping operations'. When they are notified by their informers that there may be a poaching gang in a certain area and there is insufficient manpower in that place, the park staff and the army unite and carry out a joint patrolling exercise, sometimes with elephants. Park officials have shown that these sweeping operations, which often last for days in critical areas, have



These cattle have been impounded by the Royal Nepali Army for illegally grazing inside Royal Chitwan National Park. The owners will have to pay a fine to get them back.

greatly deterred poachers and those engaging in other illegal activities, such as collecting firewood, smuggling timber and grazing livestock illegally (see table 3).

The strong cooperation between the park and its partners—the Royal Nepali Army, DFOs, the Buffer Zone Development Council, and NGOs—over the past few years has greatly reduced poaching in and around Bardia Park. This strong cooperation is probably the most important single component of Bardia's

Table 3. Illegal activities carried out in Royal Bardia National Park, 1998 and 1999

Case	1998		1999	
	Incidents (no.)	Offenders (no.)	Incidents (no.)	Offenders (no.)
Animal poaching	6	8	1	1
Firewood collection	11	195	16	295
Timber smuggling	3	9	1	10
Grass cutting	13	71	9	134
Fishing	6	67	3	22
Fish poisoning	1	8	—	—
Mushroom collection	2	12	2	43
Fern collection	3	24	—	—
Illegal entry	1	7	1	21
Illegal cattle grazing	—	—	—	512

Source: Bhatta and Subba (2000 p. 4, 8)  
— no data



anti-poaching strategy for rhinos, followed closely by the effectiveness of the informers.

## The importance of adequate budgets

Chitwan Park earned USD 746,926 in the financial year of 1999/2000 (see table 4), 97% of this coming from tourist activities, but all this has to be given to the central government. In turn the central government gives DNPWC a budget for Nepal's parks, and from this Chitwan Park was allocated USD 146,971 in the financial year of 1999/2000 (see table 5). This is less than 20% of what the park earned and is not enough to operate the park adequately. The budget of Chitwan Park (excluding the army) was cut from

USD 219,488 in 1994/95 to USD 146,971 in 1999/2000 because the funds supplied by the Central government to DNPWC were reduced. The budget for Bardia Park (excluding the army) has also significantly declined from 1994/1995 (see table 5). For the first time in the park's history, however, revenue in 1999/2000 exceeded Bardia's budget (except for the cost of the army) because of the sharp increase in tourist numbers (see table 6). DNPWC officials report that they need more government money to ensure a bright future for the rhinos.

## Conclusion

The anti-poaching strategies that DNPWC has developed for the Chitwan Valley and the Bardia area are

Table 4. Revenue raised in Royal Chitwan and Royal Bardia National Parks for 1997/1998 to 1999/2000

Year	Royal Chitwan National Park		Royal Bardia National Park	
	Nepalese rupees	US dollars	Nepalese rupees	US dollars
1997/1998	48,150,192	801,969	2,669,277	44,193
1998/1999	54,543,777	814,086	4,226,068	63,076
1999/2000	51,537,864	746,926	7,615,768	110,373

Source: Subba (2000 p. 14, 2001 p.18)

Table 5. Department of National Parks and Wildlife Conservation budgets for Royal Chitwan and Royal Bardia National Parks, 1994/1995 to 1999/2000

Year	Royal Chitwan National Park	
	Nepalese rupees	US dollars
1994/1995	10,893,200	219,488
1998/1999	8,197,000	122,343
1999/2000	10,141,000	146,971
	Royal Bardia National Park	
1995/1996	16,634,000	312,669
1998/1999	6,389,000	95,358
1999/2000	6,770,000	98,116

Source: Subba (2000 p. 23, 2001 p. 27)

Table 6. Number of tourists visiting Royal Chitwan and Royal Bardia National Parks, 1997/1998 to 1999/2000

Year	Royal Chitwan National Park	Royal Bardia National Park
1997/1998	104,046	?
1998/1999	105,884	5,864
1999/2000	117,512	9,610

Source: Royal Chitwan and Royal Bardia National Parks, unpublished statistics

excellent, but they are complicated and definitely require superior management skills if they are to be implemented successfully. DNPWC does have a few officers who are capable of putting into action such strategies. Its director general must ensure that such officers are always in place, as these parks contain one of the most endangered large animals in the world, the greater one-horned rhino.

For the successful conservation of the rhino to continue in Nepal, more financial resources need to be allocated in keeping with the large sums of money raised from tourists who come to see the rhinos. The DNPWC director general is aware of the importance of greater funding for Bardia and Chitwan. He also realizes the value of informers and reward money. Most

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of this money comes from NGOs, and DNPWC Director General Maskey acknowledges that there is no long-term guarantee that the NGOs will continue to pay money to informers and for rewards at the levels required. To partially remedy this situation, he has proposed that a trust fund be established with considerable sums of money to help support Nepal's parks (T. Maskey, pers. comm. 2001).

The demand by some North American zoos is for at least six pairs of rhinos from the wild populations of the Indian subcontinent. For political reasons, India is unlikely to allow the export of live rhinos in the near future. Since one breeding pair of greater one-horned rhinos is worth to certain zoos a minimum price of USD 250,000 to 300,000, perhaps the Nepal government might consider selling several pairs of their rhinos from those areas of Chitwan Park where there is a surplus. This money could then be put into the trust fund to ensure that the remaining rhinos are well protected from poachers. This proposal is a controversial one, but Nepali officials should not be deterred from considering it. There is also a precedent for such a sale; the government of Nepal, as well as having donated live rhinos as state gifts, has sold some to various foreign institutions, such as the pair sold to the Singapore Zoological Gardens for USD 250,000 in 1987 (Bernard Harrison, executive director of Singapore Zoological Gardens, pers. comm. 1990). Between 1980 and 1997, 25 live rhinos were sent from Nepal to various countries including 4 to India, 4 to the USA, and 3 to Germany (Suwal and Shakya 2000).

There is also another precedent, in a different part of the world, for the commercial sale of rhinos by a government department. The KwaZulu-Natal authorities in South Africa have been selling live black and white rhinos for years. In their auction held in 2000, six black rhinos were sold for a total of USD 330,000 and 43 white rhinos for USD 1,230,000 (Emslie 2000).

Money plus good leadership and efficient management by senior personnel are going to continue to be the two key factors for the success of rhino conservation in Nepal.

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