

THE UNIVERSITY OF CALGARY

**An Anti-Poaching Strategy for the Greater One-Horned Rhinoceros in
Kaziranga National Park — Assam, India**

by

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in partial fulfillment of the requirements for the degree of
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ABSTRACT

This Master's Degree Project reviews the current state of conservation of the Greater One-horned Rhinoceros (*Rhinoceros unicornis*) in Kaziranga National Park, Assam, India. Particular attention is paid to three primary areas: the significance of Kaziranga National Park — also a UNESCO World Heritage Site — as home to the world's greatest and last truly viable population of the Greater One-horned Rhinoceros; the current poaching situation; and, a review of both the Park's anti-poaching enforcement strategy and the current anti-poaching efforts undertaken by its enforcement personnel.

The conclusion argues that, in light of the current state of conservation infrastructure in Kaziranga and in the State of Assam, the Park's anti-poaching strategy must be a defensive mechanism to preempt poaching and not an offensive mechanism to confront poachers.

The proposed intervention is an attempt to capitalize on the Park's three greatest assets — the dedication of the enforcement personnel, their intuitive knowledge of and experience in the Park, and the Park itself with respect to a combination of factors related to terrain and wildlife — by employing the first-hand environmental knowledge and conservation enforcement experience of Park staff in the development of a new on-ground anti-poaching strategy. Integral to this intervention design is the need to raise the morale of the enforcement personnel. To that end, the establishment of a sister-park programme with a Canadian World Heritage Site is proposed.

KEY WORDS

- Greater One-horned Rhinoceros
- conservation enforcement
- community participation
- Kaziranga National Park
- anti-poaching strategy
- Traditional Environmental Knowledge
- Rhinoceros unicornis
- conservation strategy
- endangered species
- Poaching
- UNESCO
- TEK
- rhino horn
- conservation
- India
- wildlife parts and products
- World Heritage Sites
- iconographic mapping

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To my parents Noli and Murray, my sisters Lauren, Jacqui and Deb, my brothers Sam, Marc and Jeff, and my nieces Mauri, Alexandra and Charisse: you humour me, you support me, you champion my causes, you believe in me, you challenge me, you inspire me—for everything you are to me, for everything you let me put you through, I love you and I thank you. And finally to Shade, my wolf boy, who forgives my neglect and who now sits patiently by my side, pawing my leg and yawning at my computer, reminding me that it's time to go for a walk.

DEDICATION

We are Assamese... We must protect the rhinos... The rhinos were here first... It is their land... We have displaced them... We have hunted them... We have exploited them... Those that are left, it is our duty to protect... if we do not, who will?

Range Officer D. Boro
Kaziranga National Park
June 1997

This MDP is dedicated to the range officers, forest guards and staff of Kaziranga National Park.

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PART I — INTRODUCTION

My goal in writing this Master's Degree Project (MDP) is to set out one possible approach to conservation and anti-poaching strategy for endangered species in Kaziranga National Park (KNP) in the state of Assam in northeast India. There are myriad conservation strategy alternatives; however, based on my experience while on patrol with the forest guards and range officers in Kaziranga in the summer of 1997, the intervention I have designed is tailored specifically for KNP's needs and serves dual purposes integral to successful anti-poaching conservation in general, and the survival of the One-horned Rhinoceros in particular.

First and foremost, this MDP is designed to give conservation enforcement personnel (i.e.: KNP range officers, forest guards and support staff) a stake in conservation beyond their professional duties and personal sacrifices. I propose to accomplish this through an ethnographic process of soliciting, capturing and interpreting their first-hand, or experiential, environmental knowledge of KNP for use in anti-poaching strategy. Though the outputs of the implemented project itself would be physical (i.e.: maps and strategy plans), it is my hope that the consequences, more significantly, would be psychological and emotional as the men could take away from the project a sense of pride, conservation ownership, and knowledge that strangers to their immediate community recognize the value of their experience and sacrifice. Second, the intervention is designed to create a contemporaneous database of relationships and patterns of events (relevant to poaching) in KNP. The data could then be manipulated graphically through a process employing Geographic Information Systems (GIS) in hopes of revealing potential solutions to poaching problems.

I refer to these dual purposes as "*integral to successful anti-poaching conservation in general, and the survival of the One-horned rhinoceros in particular,*" because successful conservation enforcement in Kaziranga is built on a foundation of selfless and often suicidal commitment to species survival. But for the forestry staff's dedication and perseverance, the rhino

would be lost. This alone warrants commendation; commending them by preserving and applying their knowledge to conservation could be a highly effective way of boosting their waning morale and combating poachers at the same time. This MDP, then, is about the front line of endangered species conservation in India — the thin green line between preservation and exploitation. In essence, this MDP is designed for the forest guards and range officers of Kaziranga National Park who spend their days and nights patrolling 430 km² of jungle against rhinoceros poachers.

The following comments are intended to introduce readers to the factors that complicate rhino conservation in Kaziranga National Park. They should be read as prefatory to a detailed consideration of these factors in PART II of this document— Findings/Interpretation.

Poachers steal into the park in small gangs to collect the horn of the Greater One-horned (or Indian) Rhinoceros (*Rhinoceros unicornis*); there are only an estimated 2,200 of this species left in the world, about 1,200-1,300 of which live in Kaziranga. (There are five species of rhino numbering about 12,000 in the world, including the Square-lipped or Southern White Rhinoceros—*Ceratotherium simum simum*, the Javan Rhinoceros—*Rhinoceros sondaicus*, the Sumatran Rhinoceros—*Didermocerus sumatrensis*, and the Black Rhinoceros—*Diceros bicornis*.) (Menon, 1997: pers.com.) They are motivated by the financial rewards offered by the international black market in wildlife parts and products, where a single rhino horn is worth thousands of dollars. (Menon, 1996)

Rhino poaching and conservation in India is a high-risk, high-return, high-stakes game that heavily favours the bad guys — the poachers and traders. The odds are stacked so highly against effective conservation, that at times — especially during the annual flooding of the Brahmaputra River from June to October when much of Kaziranga is underwater — one would expect the good guys to fold. But they don't. Against all odds, the range officers and forest guards of Kaziranga succeed. Against a backdrop of a neglectful, egotistical and corrupt bureaucracy, political turmoil, hapless and haphazard planning, military insurgency, rapacious industry, a hostile and unforgiving environment, often vengeful and mercenary neighbors, an apathetic, unappreciative and unapologetic global public, a billion dollar international black market in wildlife parts and products,

crumbling infrastructure, technological retardation, and impotent legislation, these men persevere — 24 hours a day, 365 days a year.

In light of these circumstances it is difficult to understand their commitment, to appreciate the ties that bind them to Kaziranga. The unique set of circumstances at play in the Park begs of the enforcement personnel the question, why do you do it? To them the answer is simple. They each view their job as forest guard or range officer as their personal duty: “We are Assamese... we must protect the rhinos. The rhinos were here first. It is their land. We have displaced them. We have hunted them. We have exploited them. Those that are left, it is our duty to protect... if we do not, who will?” (Boro, 1997: pers.com.) To some, the commitment to rhino preservation is spiritual; it is essential to their being. There is a connection to the land, an affinity with the wildlife. To others, the commitment is based on a sort of precautionary pragmatism: “Because we do not know what will happen [to us and to the world] if the rhino becomes extinct.” (Mahanta, 1997: pers.com.)

These men want to practice proactive conservation. They would prefer to act expressly as foresters and wildlife stewards. They would prefer that the weapons they carry need only be raised as the last line of defense — a line they would prefer not to cross. However, for the most part the conditions in which they live and work force them daily to cross that line; force them to take a reactive approach to combating poaching and resource exploitation. They have been forced to adopt an unofficial, unspoken, and at times illegal policy of shooting and killing poachers, because arresting them only delays the poaching of another rhino or the killing of another forest guard. (Sharma, 1997: pers.com.)

Every moment Kaziranga’s officers are on duty, which is every moment they are in the Park, they are in peril. They live in a jungle and are forced by those who would sell off every living thing in Kaziranga for a rupee, a dollar, a yen, or a pound, to live by jungle law: survival of the fittest. Political and military unrest, combined with declining wildlife populations and heightening international demand for wildlife-derivative medicines, have placed these men in an arena of guerrilla warfare. (Wright, 1997: pers.com.)

Poachers are opportunists; their success depends on stealth and the element of surprise. (Sharma, 1997: pers.com.) Poachers are well armed with sophisticated weaponry, no shortage of ammunition, and no regard for life other than their own — even at that, they knowingly risk their own lives for the financial rewards offered by the illegal trade in rhino horn. (Bonai, 1997: pers.com.) The main shooter in a poaching party will be paid (on average) \$500 (US) for a rhino horn. (Menon, 1996) A forest guard will make (on average) \$70 (US) a month, with which they must support their families and purchase their own rations. (Das, 1997: pers.com.) In real terms, a forest guard would have to work for seven months to make the same amount of money a poacher will make in one successful trip to Kaziranga. Crime pays; conservation does not.

Poachers do not want to be caught and arrested and imprisoned, or shot. They will not hesitate to shoot conservation officers, either in self-defense or in murderous ambush. They do not negotiate. They do not reason, except when surrender is the only alternative to death. (Sharma, 1997: pers.com.) The forest guards do not have law-enforcement training. They know very little about forensic science, preserving a crime scene, or building a case. Even if they do capture a poacher alive, which is their objective, he will often be released on bail or have the charges dropped because of the forest department's inability to prove to a court that "*that* poacher killed *that* rhino with *that* gun." (Bonai, 1997: pers.com.) A slaughtered rhino is easier to find than a needle. Kaziranga, however, with its five-metre high grass, swamps, dense forests, poachers, tigers, wild buffalo, king cobra and wild elephants, is considerably more challenging to explore than a hay stack. Convicted and incarcerated rhino poachers — in those rare instances when they are taken alive and jailed — are rarely reformed or rehabilitated by their time in prison. To most of them it is lost time. Once out of jail they are back in Kaziranga, endangering rhinos, endangering forest guards. (Sharma, 1997: pers.com.)

In addition to its designation as a national park, Kaziranga has also been designated a World Heritage Site for its remarkable biodiversity by the United Nations Educational, Scientific and Cultural Organization (UNESCO). But tags and titles confer political status, not meaningful physical protection. We entrust the safety of our natural heritage to toothless paper tigers and

ignore human survival realities and the environmental consequences of poverty. International agreements and unilateral statements are not part of a poacher's reality; they will not keep a horn on a rhino, nor will they stop a bullet from killing a forest guard. We have secured Kaziranga in a safety deposit box for natural treasures where it is taking its place in history next to all those other treasures we have protected soundly on paper and conveniently, ignominiously forgotten. Agreements, conventions, treaties abound. But in this conservation battle, the pen is not mightier than the sword, or the bamboo stake, or the AK-47. Lest we forget, protected area status and treaty ratification is not the end, but the beginning; it is where on-ground, front-line conservation starts. And in Kaziranga, where politicking ends, conservation begins.

While on patrol with Kaziranga's keepers, I had many opportunities to discuss with them their perspectives on conservation, on living and dying in Kaziranga, on poaching, and most interestingly on global conservation apathy. Aided by an interpreter, the discussions evolved from matter-of-fact statements regarding conservation politics and survival realities, to philosophical "big picture" explorations of our (human) role in Kaziranga's ecology.

They asked if we can we extend metaphorically the age-old question of whether an unseen tree falling in a forest makes a sound, to a rhino? Or, to Kaziranga? Or, to a forest guard? If a tree falls in the forest... if a rhino is poached... if a forest guard is killed... if Kaziranga is destroyed and nobody takes notice, will we "hear" it? (Das, 1997: pers.com.) I would argue that the "sound" at issue is not so much one of noise, but one of ecological impact. Will it affect us individually? Will it affect us ecologically? Will it affect us globally? Should we sound the alarm for the rhinos? Should we cry out against man's inhumanity to man?¹ Should we protest that political unrest and poverty have led to a blood feud between those who see nature as the monetary sum of its parts and those who live and die to stop its wholesale slaughter? How do we answer these questions so that our actions speak louder than our words, and our words do not merely pay lip service to the tenets of ecosophy and the prevention of ecocide. Fortunately, the forest guards

¹All of the forest guards are men; the forest guards and range officers did not mention having come across a female poacher in KNP.

of Kaziranga speak and act for us. This MDP is an attempt to ease their burden to ensure that neither they nor Kaziranga succumb.

Despite that the men in each of the camps I visited could euphemistically be described as underpaid, overworked, inappropriately outfitted, fatigued, and in numerous instances injured or infected with disease, every one of them was excessively generous with their offers of food and drink and conversation and insight. Their morale, which not surprisingly is quite low, peaked at the thought of people here learning of their situation.

Finally, before beginning, I believe it is important to mention two environmental pioneers who were firmly rooted in my thoughts throughout this project: Native American Chief Seattle, and Mohandas Karamchand Gandhi — the father of the Indian nation. I encourage readers to keep in mind the logic of their individual philosophies in light of the findings and recommendations herein.

First, the following excerpted passages were originally attributed to Chief Seattle in his 1854 speech to the US government in response to its proposal to purchase Puget Sound in the state of Washington. These words, though their origin is the subject of ongoing debate, were intended as a statement of native environmental consciousness to be adopted by the US government as conditions of the sale. In the end, the Suquamish and other local Indian tribes sold two million acres of land to the American government for \$150,000. These words reflect the precautionary pragmatism of KNP's forest guards in their perseverance to protect endangered wildlife, fearing the unknown consequences of extinction:

What is man without the beasts? If all the beasts were gone, man would die from a great loneliness of the spirit. For whatever happens to the beasts, soon happens to man. All things are connected.

Whatever befalls the Earth befalls the sons of the Earth. If men spit upon the ground, they spit upon themselves.

This we know - the Earth does not belong to man - man belongs to the Earth. This we know. All things are connected like the blood which unites one family. All things are connected.

Whatever befalls the Earth - befalls the sons of the Earth. Man did not weave the web of life - he is merely a strand in it.

Whatever he does to the web, he does to himself.

Where is the thicket? Gone. Where is the Eagle? Gone.

The end of living and the beginning of survival.

Second, this statement by Mahatma Gandhi, spoken less than a century after Chief Seattle's speech, resonates through Kaziranga and underlies the life and death struggle in which the forest guards exist.

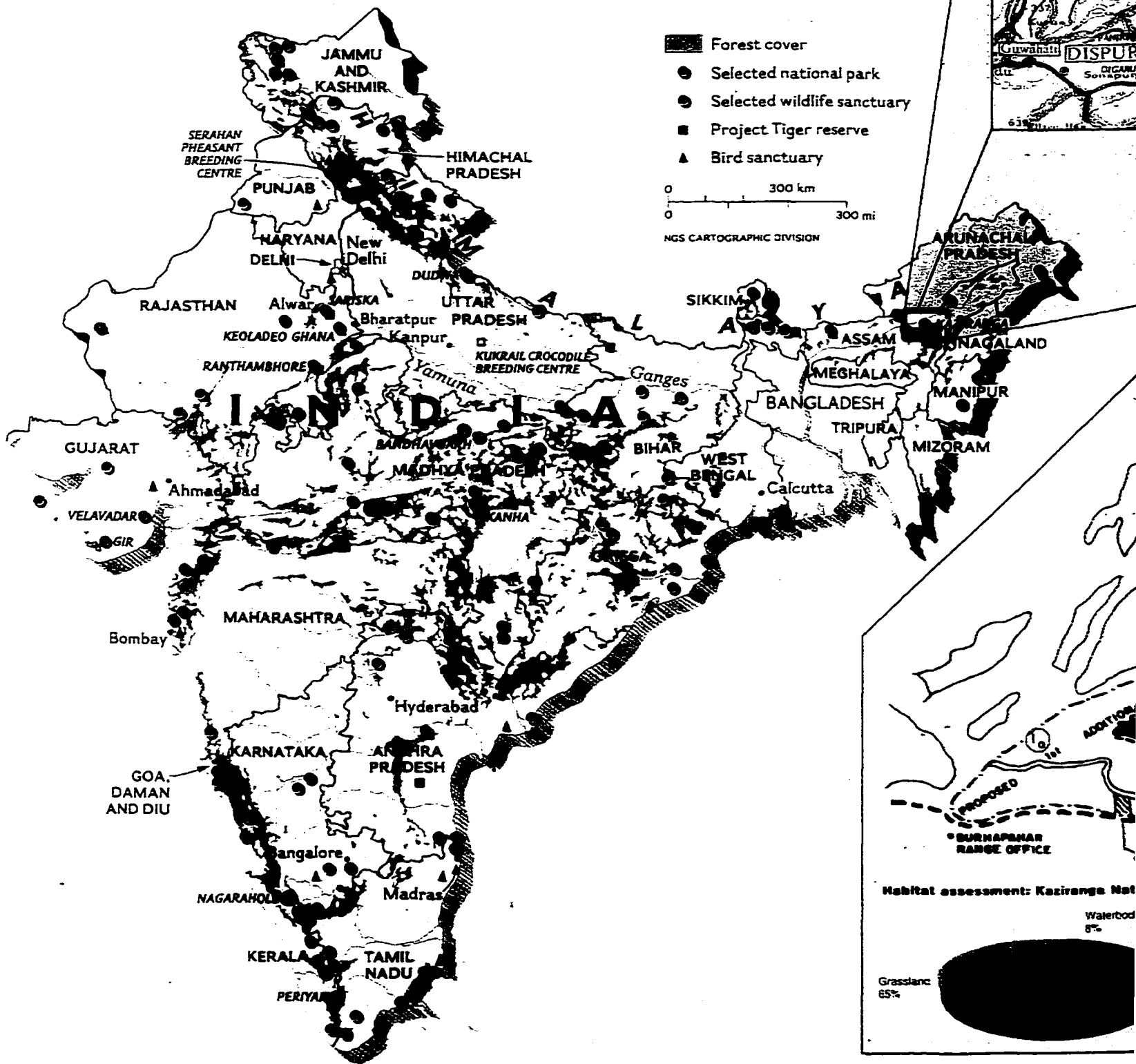
We cannot have ecological movement designed to prevent violence against Nature, unless the principle of non-violence becomes central to the ethos of human culture.
(Khoshoo, 1995: 65)

The roads upon which the ecosophies of Chief Seattle and Gandhiji travel, converge at Kaziranga. Where poverty, greed, political insurgency, Traditional Chinese Medicine, and conservation meet, where rhinos and poachers and forest guards are killed, the roads diverge. It is not nearly so peaceful as Robert Frost's "yellow wood." If the range officers and their men are to follow Chief Seattle's words and preserve the beasts, there will perforce be bloodshed. Men will die protecting the beasts; men will die exploiting the beasts. If Gandhi's philosophy is to be heeded, and the range officers and their men adopt a policy of nonviolence, the beasts will lose their guardians. In theory, these philosophies should apply to all of the players on this stage. But they do not, and it is unlikely that they will anytime soon. The market in wildlife is the product of a perverse incentive. (Geist, 1994: pers.com.) As long as there is a demand, and until the supply is exhausted, it is unlikely that consumers, distributors, producers and suppliers of wildlife-parts based products will follow the parallel paths mapped out by Chief Seattle and Mahatma Gandhi. Hence, the roads diverge.

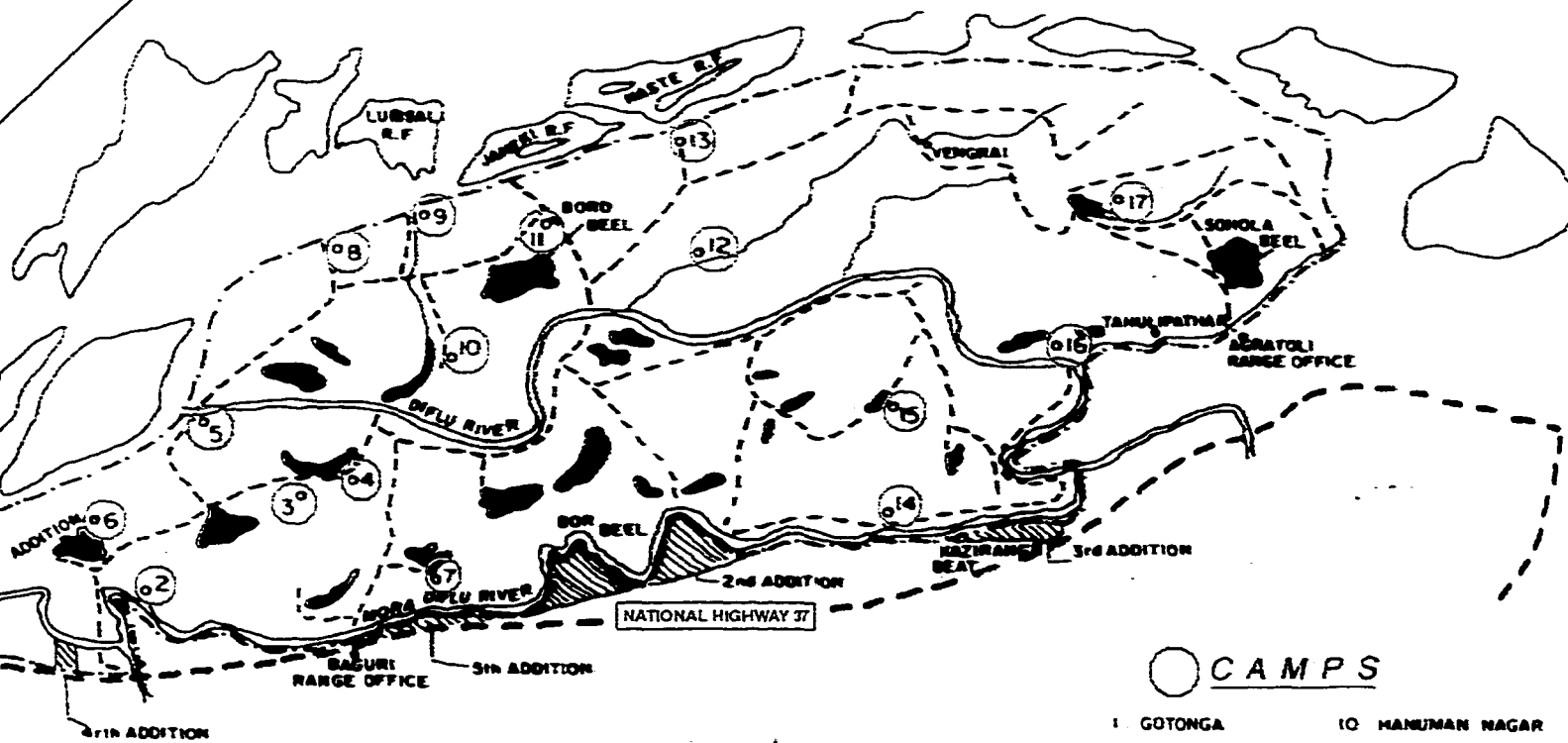
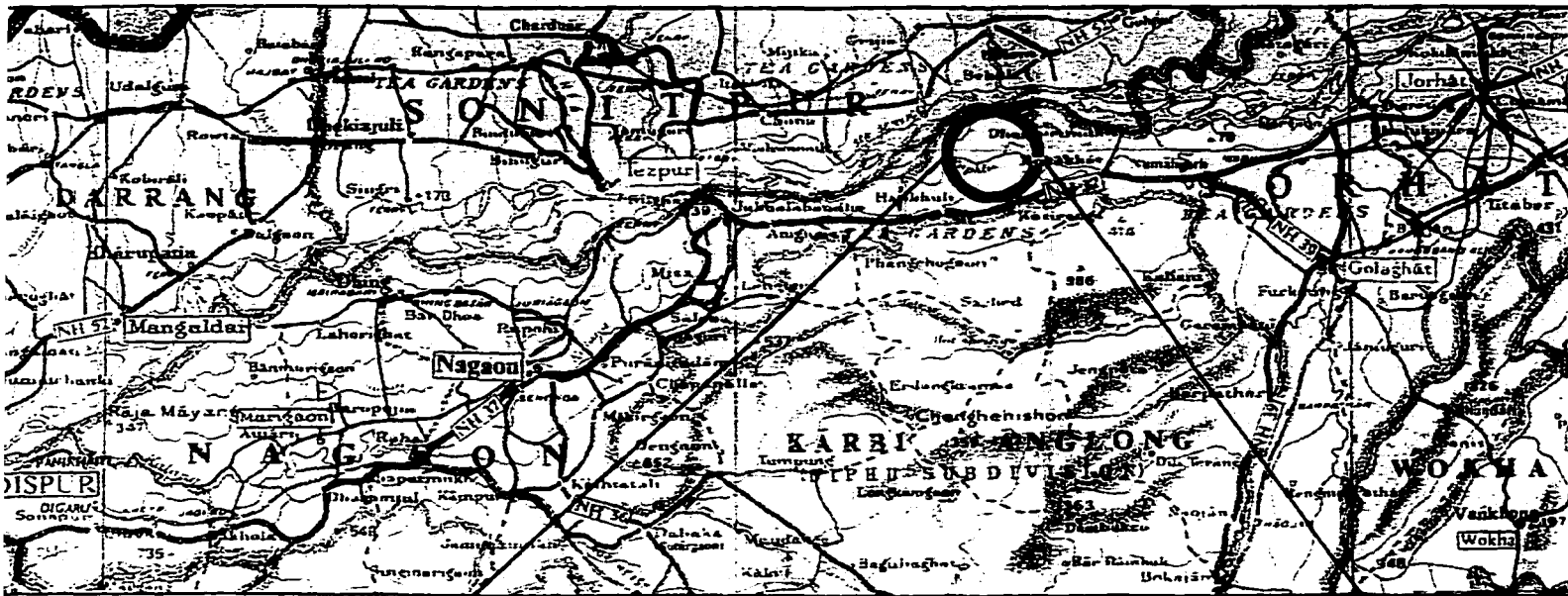
As a global society, as a species, the forest guards believe that we stand at that crossroads as one traveler. To one side the road is well traveled and it slopes downward worn slick with heavy footprints rushing blindly to certain peril. To the other, the road is much less traveled. It is steep and tortuous and fraught with pitfalls and dead ends, but at the top of the hill there is a clearing that hints at a peaceful and unobstructed panorama; the path of least resistance, or an uphill battle. Understanding how way leads on to way and the unlikelihood of returning to take the other road, the forest guards, like Frost, chose the road less traveled by and, in Kaziranga, that has made all the difference. This document is an accounting of the factors involved in Kaziranga National Park's battle with poachers to preserve the One-horned Rhinoceros.

Figure 1
Map of Kaziranga National Park, Assam, India

Source:
 India — National Geographic, 1992
 Assam — Survey of India, 1984
 KNP — Menon, 1996







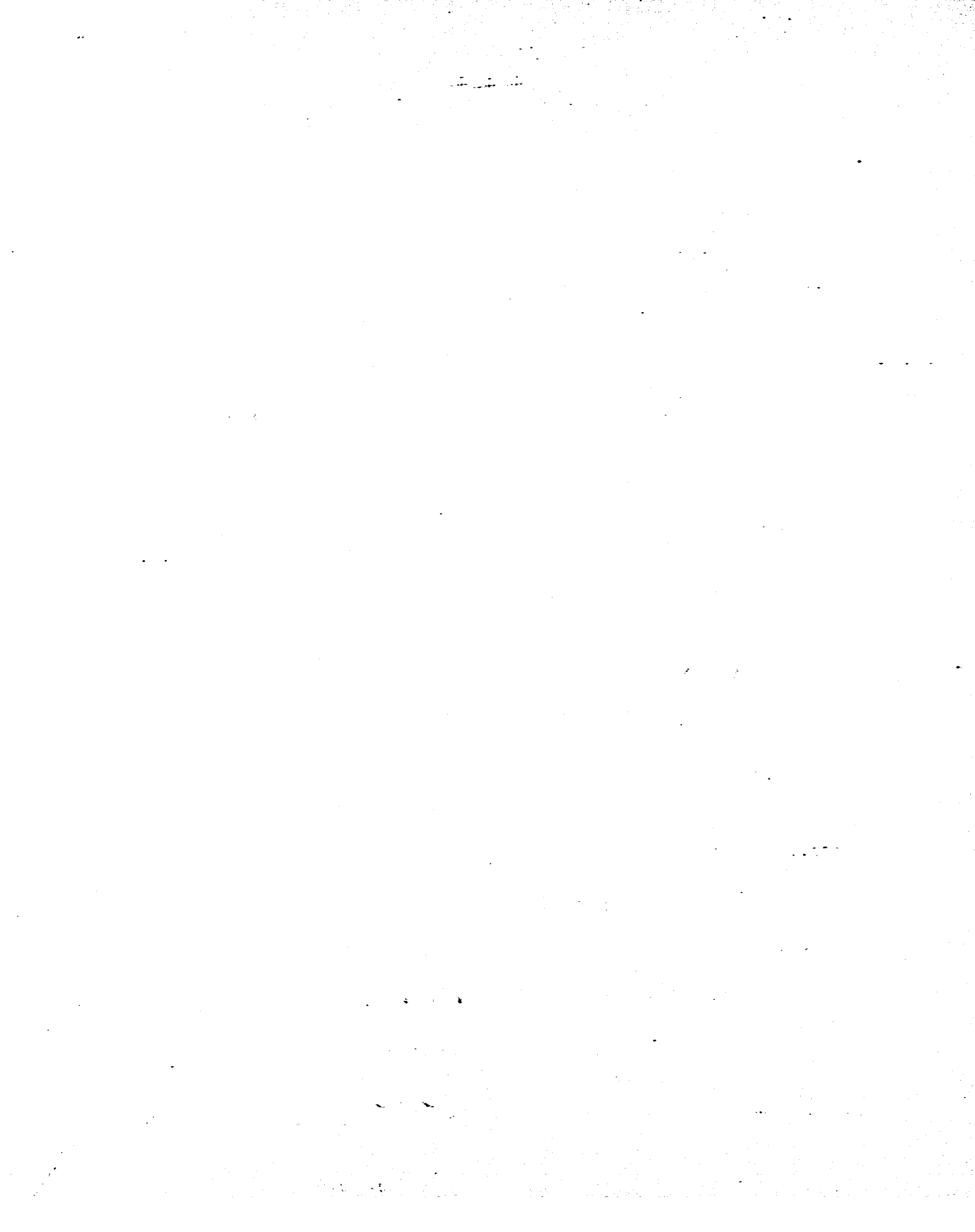
National Park
 Waterbodies 8%
 Woodland 27%

KEY

- NATIONAL PARK BOUNDARY
- ROAD
- FOREST ROAD
- ~ RIVER
- BEEL

CAMPS

- | | |
|-------------|-------------------|
| 1 GOTONGA | 10 MANUMAN NAGAR |
| 2 DEOPANI | 11 ARIMORA |
| 3 BOROBEEEL | 12 DMEKIATALI |
| 4 BIMOLI | 13 KOTHRAMARI |
| 5 DIFLUMUKH | 14 TUTALIGOR |
| 6 DAFLONG | 15 BAGH MARI |
| 7 RAWMARI | 16 ARIKATI |
| 8 KAYTIKA | 17 RANGAMOTI CAMP |
| 9 GOBRAI | |



Chapter 1 — Background

This MDP began in the summer of 1996, pursuant to recommendations made by the Convention on International Trade in Endangered Species (CITES) for research into improving the legal regime of tiger conservation. Additionally, I undertook this project at the urging of parties at various NGOs who voiced interest in a law-based strategy for the conservation of the Tiger (*Panthera tigris*).

By December 1996 I had developed a draft strategy, called SPECIES (Strategic Program for Ecosystem Conservation of Internationally Endangered Species). My goal with SPECIES was to design a strategy that could adapt international wildlife agreements and national policy to a system that encouraged social participation in — and an ecosystem approach to — endangered species conservation. The strategy was built on a foundation of two fundamental principles: Ecosystem-based management, and Science-based policy. The essence of the former was that policy must consider inseparable the conservation of habitat and the conservation of endangered species, as all ecosystem components must be viewed as part of the whole and managed collectively. With respect to science-based policy, SPECIES mandated that endangered species conservation policy defer to the best available (and future) scientific information; where science is lacking or ambiguous, the “Precautionary Principle” must apply.

At the heart of this original project was the need for a new conservation strategy, as current strategies were (and are) growing increasingly less effective. (Mills, 1996: pers.com.) SPECIES endeavored to capture the most significant legal aspects of existing conservation efforts and encourage social buy-in at a community level. In practice, a citizenry disposed to the illegal killing and marketing of wildlife is not effectively dissuaded or discouraged from poaching by national endangered species conservation policies. In other words, the law alone without substantial on-the-ground deterrents to poaching is not enough. The reluctance of a people to accord their conduct with wildlife laws stems, historically and in practice, from wildlife being placed in the hands of the elite — politicians, scientists, the affluent — and out of public control. If the public derive little or no benefit from following endangered species policies, and believe the policies are in

Chapter 1 — Background

This MDP began in the summer of 1996, pursuant to recommendations made by the Convention on International Trade in Endangered Species (CITES) for research into improving the legal regime of tiger conservation. Additionally, I undertook this project at the urging of parties at various NGOs who voiced interest in a law-based strategy for the conservation of the Tiger (*Panthera tigris*).

By December 1996 I had developed a draft strategy, called SPECIES (Strategic Program for Ecosystem Conservation of Internationally Endangered Species). My goal with SPECIES was to design a strategy that could adapt international wildlife agreements and national policy to a system that encouraged social participation in — and an ecosystem approach to — endangered species conservation. The strategy was built on a foundation of two fundamental principles: Ecosystem-based management, and Science-based policy. The essence of the former was that policy must consider inseparable the conservation of habitat and the conservation of endangered species, as all ecosystem components must be viewed as part of the whole and managed collectively. With respect to science-based policy, SPECIES mandated that endangered species conservation policy defer to the best available (and future) scientific information; where science is lacking or ambiguous, the “Precautionary Principle” must apply.

At the heart of this original project was the need for a new conservation strategy, as current strategies were (and are) growing increasingly less effective. (Mills, 1996: pers.com.) SPECIES endeavored to capture the most significant legal aspects of existing conservation efforts and encourage social buy-in at a community level. In practice, a citizenry disposed to the illegal killing and marketing of wildlife is not effectively dissuaded or discouraged from poaching by national endangered species conservation policies. In other words, the law alone without substantial on-the-ground deterrents to poaching is not enough. The reluctance of a people to accord their conduct with wildlife laws stems, historically and in practice, from wildlife being placed in the hands of the elite — politicians, scientists, the affluent — and out of public control. If the public derive little or no benefit from following endangered species policies, and believe the policies are in

fact contrary to their interests, there is little motivation not to pursue self-interest. (Geist, 1994: pers.com.) In terms of the individual, this often translates into poaching for the riches offered by the illegal market in wildlife parts and products. Poverty, unfortunately and often unavoidably, is the greatest correlate to poaching.

The wildlife trade, and particularly that part of the industry tied to Traditional Chinese Medicine (TCM), is a highly lucrative business for both the raw-materials supplier and the end-product distributor. The original project, SPECIES, was intended as a response to some of these issues by way of a strategy to provide local peoples with alternatives to poaching, and to incorporate an ecosystem perspective into the legal regime of endangered species conservation.

My goal in going to India was to interview key individuals at tiger preserves with respect to the practical application of SPECIES to the Tiger, and to correct deficiencies in SPECIES as identified by these key informants and through the course of my observations. I arrived in India in June 1997 for six weeks of fieldwork. I met with both the director of the Wildlife Protection Society of India (WPSI) and the director of the World Wildlife Fund (India). After discussing my MDP with both of these highly informed individuals, they suggested that to get at the heart of the conservation situation the best men for my interviews would be found in Kaziranga National Park, as elsewhere with little exception the men who work for the forest department do so for pragmatic financial reasons: it is merely a job and there is seldom even a modicum of devotion. (Wright, 1997: pers.com.) The poaching is out of control in many areas simply because the forest guards are not willing to risk their lives for the amount they receive. (Wright, 1997: pers.com.)

I spent three days in the WPSI and WWF libraries, collecting and digesting as much information as possible on KNP and the socio-political situation in Assam. I quickly understood why SPECIES, though theoretically sound in general, is impractical and in fact untenable in KNP given the socio-political realities of endangered species conservation in northeast India. I traveled to Kaziranga in hopes of developing a new strategy, understanding that my focus was shifting from addressing the causes of poaching to addressing its effects.

Chapter 2 — Objectives

Understanding that the greatest challenge to conservation in KNP is rhino poaching, I went into the Park with one primary objective: to develop ideas regarding anti-poaching strategy. With this in mind, a number of questions arose:

Who are the poachers? (Are they local people from neighbouring villages?) Why are they poaching? (Can they be provided with alternatives to offset their need to poach?) What factors facilitate rhino poaching? (Is there collusion between the poachers and enforcement personnel? Is Park staff apathetic? Is there a breakdown in law and order?) What factors hinder poaching? (What tools, strategies and resources are being used to combat poaching?) What factors hinder conservation? (Is there disorganization, lack of commitment, administrative or infrastructural shortcomings within the Park or the Assam Forest Department? Environmental factors?) What are the consequences of poaching? (Does the fallout from poaching affect more than rhino population and Park ecology?) Who is most directly affected by poaching activity? (Is it possible to combat poaching by addressing the needs of stakeholders?) What tools and resources are available that are NOT currently being used to combat poaching?

These questions formed the baseline inquiry for the first of my three formal MDP objectives:

- 1. To conduct a study of Kaziranga National Park in order to inform myself on matters relevant to the development of a successful anti-poaching strategy for the One-horned Rhinoceros.**

This was to be accomplished through the fulfillment of three fundamental objectives:

- 1.1 To tour KNP in order to appreciate (first-hand) the circumstances in which the enforcement personnel work and the factors affecting rhino poaching;
- 1.2 To consult enforcement personnel (and other appropriate parties) on matters concerning rhino conservation; and,

- 1.3 To study the most up-to-date literature on KNP with respect to the Park's administration, conservation, infrastructure and other matters relevant to poaching.²

Based on the findings from fulfilling this first objective, I developed two subsequent objectives qualified by the need to address the morale of the enforcement personnel as a key factor in the success of anti-poaching measures in KNP. These objectives are:

2. To develop an anti-poaching strategy for the One-horned Rhinoceros in Kaziranga National Park.

This was to be accomplished through the fulfillment of three fundamental objectives:

- 2.1 To design a methodology to capture and map the first-hand environmental knowledge of KNP's forest guards and range officers;
- 2.2 To make recommendations regarding the use of this information in anti-poaching strategy; and,
- 2.3 To encourage commitment from appropriate parties to the facilitation and implementation of the proposed anti-poaching strategy.

3. To raise the morale of KNP's forest guards and range officers.

Though it is impossible to guarantee that this project will have a positive effect on the men's morale, they seemed very enthusiastic about its potential effects. Toward its fulfillment, however, I consider as further objectives:

- 3.1 To reward the enforcement personnel's commitment to KNP by recognizing, valuing and employing their first-hand environmental knowledge as a meaningful and integral contribution to conservation;
- 3.2 To explore the possibility of establishing a sister-park relationship between a Canadian World Heritage Site and KNP; and, if a twinning programme is possible,
- (a) to provide a description of the twinning process.

²Notwithstanding that much has been published on Kaziranga National Park, given the dynamic state of both the environmental and the political circumstances at play there, I believed it to be of the utmost importance to rely only on the most current and reputable sources of information for an accurate assessment of the Park and its problems.

Chapter 3 — Methods

I collected the information presented in this MDP over a five-week period in India in the summer of 1997; approximately three and a half weeks of that time were spent in the Park itself on patrol with Kaziranga's range officers and forest guards. The data was collected through interviews with enforcement personnel, senior forestry personnel, and conservation experts at non-governmental organizations (NGOs) in India. As well, I consulted numerous Indian government and NGO reports, newspaper clippings, magazine articles and police records.

This MDP includes two methodologies: the first (below, titled: Phase 1, Phase 2, Phase 3) describes the background steps I took to prepare for my fieldwork in India, my course of action once there, and the factors I considered in designing the recommended intervention; the second methodology is detailed in the **Recommendations** section and is intended as a blueprint for fulfilling my objectives and implementing the recommended intervention.

Phase 1: Background research

Literature review

This step provided me with background information essential to addressing the issue of whether it was possible to design a conservation strategy for Indian tigers that was based on community participation in wildlife management, rather than the militaristic approach traditionally used to combat tiger poaching. This was not a one-time effort, but rather an iterative process that occurred throughout the design of the draft strategy (SPECIES).

Sources were consulted regarding:

- community participation in wildlife management;
- Indian wildlife conservation (law and enforcement); and,
- international wildlife law (and international law, in general).

(Summaries are included in **Chapter 5 — Literature Review.**)

Methodology design

I employed the knowledge gained in the literature review to design a conservation strategy (SPECIES) for adapting international wildlife agreements and national policy to a system that

encourages social participation and undertakes endangered species conservation from an ecosystem perspective (see **Appendix 1**). The next step was to assess the pragmatism and soundness of my strategy by interviewing key individuals at tiger preserves in India with respect to applying SPECIES to tigers. This, too, would be an iterative process of revisiting the strategy and adjusting it accordingly.

Phase 2: Fieldwork

Upon arriving in India, I met two of the contacts with whom I had corresponded regarding my original proposal (SPECIES), namely, Belinda Wright of the Wildlife Protection Society of India (WPSI), and Tom Mathew of the World Wildlife Fund-India (WWF). These individuals revealed information (discussed below in the **Findings** section) that caused me to re-evaluate my project and in fact to change my study area from central to northeastern India, and my study specimen from tigers to rhinos. As such, I thought it best to conduct a sharply focused literature review on the state of Assam and the One-horned Rhinoceros.

Literature review

I spent three days in New Delhi in the libraries of the Wildlife Protection Society of India and the World Wildlife Fund (India), reviewing all current government, NGO and news reports on Kaziranga National Park and the One-horned Rhinoceros. (This information is summarized in the **Abstract** and detailed throughout **Part II** of the document and, therefore, will not be summarized further.)

Observations/interviews

I recorded the data collected in KNP on paper in writing, on 35-mm positive (slide) film, and on audiocassette tapes. As circumstances in the Park were not conducive to structured interviews, I conducted depth interviews by way of casual (but directed) conversations with forest guards and range officers while on patrol. This format provided me with the sort of qualitative and descriptive information I was seeking and would likely not have found through a more formally structured interview format (see further comments on this below in the **On Patrol** section and in the **Bias** section). Additional interviews (also depth interviews) were conducted with officials

from the Assam Forest Department; some officers were recorded, while others requested that their comments remain "off the record." Locals not attached to the Assam Forest Department were interviewed individually and in groups. All interviews were conducted in the presence of an interpreter.

On Patrol

I spent approximately three and a half weeks on patrol in Kaziranga. Two days after arriving at Kaziranga, I arranged for ground transportation to the city of Gauhati (the state capital), where I spent two days and met with Mr. P. Lahan (Chief Conservator of Forests, CCF) to secure approval to do my field work. I returned by night bus to Kaziranga. Another day and a half was lost to monsoon conditions. I was not able to secure approval from either Mr. B.S. Bonal (KNP Director) or the CCF to stay overnight in the Park; however, with the assistance of Ms. Wright (WPSI) and Mr. Mathew (WWF), and through the generosity of my host Mr. M. Barua (also a member of the Indian Wildlife Board), I was able to secure accommodations at the Wildgrass camp across National Highway 37 from the Park.

I conducted interviews throughout the three and a half weeks in the Park. I cannot quantify the number of patrols I joined or the number of interviews I conducted, except to say the following: I would enter the Park by 6 a.m. and, depending on weather and other circumstances, would not leave until (about) 6 p.m. on most days. When I was permitted to join a night patrol, I would return to the Park at about 10 or 11 p.m. and remain for four hours (on average). On a number of occasions I attended at the Park expecting to go on night patrol, waited at the range office for as long as 45 minutes, only to be turned away because of rumors of poaching activity or threats of monsoons. This was also the case at times during the day. I snapped 480 photographs, and filled six 60-minute microcassettes (set at 1/2 speed) with interviews (for a total of 720 minutes of interviews) and translations (where necessary); at times I took notes by hand in addition to or instead of recording interviews with the cassette recorder. I spent much time in the Park observing the men, the physical environment and the wildlife; I did not conduct interviews during this time. As well, time spent in motorized vehicles (Suzuki Gypsy 4x4, speed boat) or on elephant back was

not used for interviews. Interviews were conducted at the camps, occasionally while patrolling, during rest breaks, at the range offices, in the neighbouring settlements, and at Wildgrass.

The “interviews” were approached and held as conversations, which I would steer with directed questions intended to solicit qualitative, intuitive and anecdotal responses (for an example, *see Appendix 2 — Tales from the field*). These “conversations” were almost always brief, rarely lasting more than a few minutes at a time, and usually interrupted by the demands of the moment. I later reviewed these conversations in a wide reflective context considering both the specific circumstances surrounding the anecdote and the general circumstances at play in KNP as a whole.

Phase 3: Strategizing

Issue identification

In order to design an appropriate intervention, it is imperative to identify and understand the underlying issues. Upon returning to Canada, I transcribed interviews and revisited many of the reports and documents I had collected in India. (Unfortunately, a number of documents were lost in transit; however, I kept with me the material I felt was of the utmost importance to this project.) Understanding that the single most important link in KNP’s conservation chain is the forestry personnel, the intervention must begin with them. That being the case, I attempted to view the issues with respect to the forest guards and range officers. Having identified the issues, I undertook a new literature review in search of alternatives upon which to base my intervention.

Literature review

The focus of this literature review was to identify management solutions based on first-hand environmental knowledge, keeping in the back of my mind the reality that the forest guards and range officers are in and of themselves a community.

Intervention design

Based on the unique set of circumstances at play in KNP, and in particular the pressures stemming from economics, politics, geography, climate, and the ethic and philosophy of the forest guards and range officers, it became clear that the solution must first treat the effect of the problem

— the forest guards' despair, waning morale, sense of abandonment and politico-legal impotence — before it can effectively combat the cause. The design process, then, was iterative and involved revisiting my findings in juxtaposition with strategies currently employed in KNP. For the intervention to address effectively the myriad issues facing KNP, the strategy must be:

- contemporaneous: the strategy must be dynamic to evolve naturally with KNP;
- convenient: the strategy must avoid any training that leaves patrols short-handed;
- economical: the strategy should not place a financial burden on KNP;
- empowering: the strategy must involve the conservation enforcement hierarchy from the bottom-up to ensure that all relevant personnel feel as though they play a role;
- exclusive: the strategy must not require or encourage "outsiders" to the project to enter KNP;
- inclusive: the strategy must not exclude illiterate/uneducated personnel;
- sage: the strategy must solicit the wisdom and knowledge of elderly and/or retired personnel; and,
- secular: the strategy must not encourage more than a minimum of bureaucratic involvement.

Ultimately, I used these criteria to design the strategy and methodology detailed in the Recommendations section in Part III of this MDP.

Chapter 4 — Obstacles & Bias

First, a number of limiting factors were at play on my end, independent of the information I was collecting. I had very limited resources in terms of financial and organizational support. This meant that there was little I could settle in advance of my arrival in terms of meetings, permits, approvals, transportation, contingencies and necessities of life. As such, I was often in situations where I was forced to make hasty decisions with little or no time to consider alternatives. In retrospect, I might have chosen to approach matters differently. In particular, I would preferred to have had the opportunity to return to KNP to get input from the range officers and forest guards with respect to the intervention methodology. Though I had taken all appropriate medical precautions prior to leaving Canada to conduct field work in Central India, as my study area changed to Northeastern India I was inappropriately protected against infectious agents in

Kaziranga. Ultimately, I developed an infection that caused high fevers and hallucinations that cut my research and stay in India short by at least three weeks.

The ability to communicate effectively was my primary concern regarding bias; specifically, could I trust my interpreter? Range Officers D. Boro and P. Sharma both spoke conversational English, as did Director Bonal, Deputy Forest Officer Tanwar, and CCF Lahan. At times Range Officers Boro and Sharma translated the forest guards' responses for me; I would later review these notes with my interpreter, Mr. Das, to confirm the translations. For the most part, however, I was not dealing with English speaking people, and as such was relying heavily on my interpreter. I was referred to Mr. Das, an employee of Wildgrass and a long-time Kaziranga resident, by Belinda Wright of the WPSI. Ms. Wright, though fluent in a number of Indian dialects, does not speak Assamese and has employed Mr. Das on various Kaziranga projects, including at least one book project and one film documentary for the National Geographic Society. I was also confident that his translations were accurate, as I was able confirm his information by way of further conversation with Range Officers Boro and Sharma and KNP Director Bonal, and it was consistent with information I had read in various English language reports and news articles.

My next concern involved a number of related questions, including: Could I trust that the information Mr. Das was being provided presented an accurate accounting of the situation? Could I trust what my interpreter was being told? Did I collect sufficient information from which to draw reasonable conclusions?

Based on personal prior knowledge and experience working with indigenous peoples, particularly with individuals who have not received a formal education but rather have traditional or experiential knowledge, I expected (most of) the men to respond better and more comfortably to questions soliciting qualitative, intuitive and anecdotal responses than to questions soliciting quantitative or analytical responses. As well, the telling of stories in a group setting allows for a series of checks and balances within the group regarding the accuracy of the narrative. Common threads of a land ethic, perseverance, devotion and commitment ran throughout these stories. Also

evident was a sense of despair and demoralization. This, bolstered by corroboration from the range officers, affirmed my confidence in the forest guards' information.

Interviews (or conversations) with forest guards and range officers in the Park rarely lasted for more than a few moments before being interrupted by the demands of their duties. Many hours on patrol or in the Park were not conducive to discussion due to factors such as ambient noise, necessary silence (photo opportunities, wildlife tracking), respect for the officers' privacy and peace, physical proximity and practicality while on foot patrol. I did not consider this as down time; rather, I used this time to observe the forest guards and range officers and their interactions and behaviour. Though, as previously stated, my time in the Park was limited, given the agreement between the essence of the forest guards' and range officers' anecdotes and the published reports, I am not concerned that if I had more time in the Park I would find evidence contradictory to that presented in the **Findings and Interpretation** section.

Chapter 5 — Literature Review

The following is a brief summary of background and supplementary sources that were consulted regarding:

- Community participation in wildlife management;
- First-hand environmental knowledge;
- Indian wildlife conservation (law and enforcement); and,
- International environmental law (and international law, in general).

Community participation in wildlife management³

Traditional approaches to park management in lesser developed nations have often been unsympathetic to the constraints facing local people, relying on military-style patrols, penalties and other punitive measures to exclude local people and enforce conservation initiatives. This form of conservation in national parks has been characterized as the "fences and fines" approach, and will almost always heighten conflict. Local people, who tend to be poor and outside the blanket of government services and support, often perceive protected areas as restricting their ability to earn a

³ Except where otherwise noted, this section is a brief review of Wells & Brandon, 1992.

living or to provide the necessities of life. Given the pressure of growing populations and unsustainable land-use practices outside national parks, it comes as no surprise that parks are increasingly threatened by illegal and destructive encroachment.

A growing awareness both within and outside of the conservation community of the complexity of the links between poverty, development, and the environment has led to a search for the holy grail of sustainable development and people-oriented conservation. The tide is shifting from militaristic preservation strategies to integrated conservation development projects involving co-management by local peoples. In other words, conservation of national parks in lesser-developed nations is becoming largely an inclusive operation, with respect to enlisting the cooperation of local people, rather than an exclusive one.

A significant but still relatively unexplored factor in this new philosophy (at least with respect to wildlife conservation) is the concept of "buffer zones: areas adjacent to protected areas, on which land use is partially restricted to give an added layer of protection to the protected area itself while providing valued benefits to neighbouring rural communities." (Wells, 1992: 26) Much has been written about buffer zones, but there are few working models that can provide a definitive statement on their success or failure.

Benefits of buffer zones have been divided into two groups: biological, and social. Biological benefits result from the fact that buffer zones effectively expand the protected area by keeping major human impacts at a greater distance than would a conventional boundary. These benefits include:

- providing a physical barrier to human encroachment into the strictly protected core zone;
- providing extra protection from storm damage and micro-climate variation in small reserves;
- enlarging the effective area of natural habitat of the reserve and reducing species loss through edge effects;

- extending the habitat — and thus the population size — of large, wide-ranging species; and,
- enhancing the environmental services provided by the reserve (e.g.: by protecting watersheds and by contributing to climatic regulation).

Social benefits are more questionable. The sustainable use of wild plant and animal species would require a determination of sustainable exploitation limits for a variety of species; this is likely to be very difficult. It is not clear who should be responsible or how such limits might be enforced. While it is possible that local communities would perceive a self-interest in maintaining sustainable buffer-zone exploitation, there is little if any evidence to support such an assumption. Further difficulty arises in convincing local people that restricted buffer zone access constitutes a valuable benefit if they had unrestricted use of the area prior to establishment of the protected area or if the proposed buffer zone has already been degraded.

One important social benefit is the measure of protection communities could potentially receive from wildlife depredation. In parks where large-mammal populations have expanded because of effective protection, or where wildlife migrates due to environmental conditions, the animals often pose substantial threats to local people's crops, livestock and even their lives.

Overall, one of the most significant problems with buffer zones is the implication that the limited benefits that might flow to local people can change their behaviour, reduce pressure on the plants and animals in the protected area, and enhance conservation. There is little if any evidence to support the implication. A 1988 IUCN study, in fact, found few examples of buffer zone programs that have established "stable and compatible land use systems around a protected area in such a way that local people are genuinely reconciled to the conservation function of the area."

More recent efforts have been made to enhance the utility of the buffer zone concept by changing its definition, simply, to "areas outside of parks that are designed to protect parks." This approach emphasizes protection and relegates the supply of economic benefits to local people to a secondary role, to be implemented wherever possible.

The game management areas around South Luangwa National Park in Zambia operate under this interpretation. There, wildlife is strictly protected inside national parks, but is accessible within the game management areas. In fact, the Lupande/ADMAGE (Administrative Design for Game Management Areas) development project depends on revenues from hunting in the game management areas. Because a revenue-sharing system was instituted to provide local communities with proceeds from concession and hunting-trophy fees, local people suddenly had an important interest in preserving wildlife in their immediate area. As a result, poaching has been virtually eliminated from the game management areas because of the villagers' vigilance. Wildlife populations in some game management areas now exceed those inside some national parks.

In Wildlife and People: the Zimbabwean Success, Graham Child reviews and highlights the salient features of community-based resource management programmes in eight countries in Southeast Asia, North America and Africa. Child concludes that these programmes, including Zimbabwe's CAMPFIRE (Communal Areas' Management Programme for Indigenous Resources), emphasizes that success depends on the people on the land being actively involved in the management of "their" resources.⁴ The theory behind these community-based wildlife (and resource) management programmes is that the individuals who benefit from a resource should be held responsible for its management and sustainable use.⁵ According to Child, the success of community-based wildlife/resource management programmes depends on meeting all (or most) of the following criteria:

1. Producers, managers and beneficiaries should be the same people

The person or group of people who benefit from the primary use of a resource should be held fully responsible for managing it correctly. This implies full proprietorship of the resource by land holders, with "ownership" being at the individual, household, extended family, or such other social level as is culturally appropriate.

⁴ Of course (as will be discussed in the **Findings**), the main distinction between the problems and potential solutions in the areas Child reviews and the problems in KNP, is that the communities surrounding KNP are not responsible for the poaching. In other words, community-based wildlife management in the traditional sense is not a practical solution to the problems in Kaziranga, because the communities surrounding KNP are not the problem.

⁵ As will be discussed subsequently, though there is some evidence of locals assisting the foreign (i.e.: non-local) poachers, the villagers are not the direct beneficiaries of KNP's resources. As the problem in KNP is not a scarcity of resources, unlike parks elsewhere where community-based wildlife management has proven effective, putting the care of the park and the management of resources in local hands is not about to address problems of foreign invaders, military insurgency, and the Traditional Chinese Medicine market in rhino horn.

2. **“Producer communities” should be small enough for all households to participate in the programme**

The whole community should be able to “meet under the indaba tree” to decide management issues, as was customary in the traditional open governance that predated colonialism in Africa. If a community is too large or too dispersed for free discourse between members it is preferable if it divides into smaller entities, each of which may then be represented on a coordinating body.

3. **Bodies representing a community should be accountable to the community**

Any body set up by a community to undertake a function for it should report back regularly to its constituency. These reports are, in effect, to the shareholders in a common venture and should be easily understood by all concerned.

4. **Functions should be devolved to the lowest level of social organization at which they can be performed properly**

Wherever possible responsibility for wild resources should be devolved to the producer or producer community. Only if the producer cannot perform a function should it be devolved to a higher level of governance.

5. **There must be a close link between production and benefits**

All revenue earned by a producer community should be paid directly to the community. This includes licence and concession fees from tourism and hunting or fishing. Thus, the full value of the animal hunted in an area should be returned to the area.

6. **Producer communities must be able to allocate their earnings as they wish**

The households in a producer community should be able to use their share of a harvest as they wish. Where money is earned, all the households should be able to decide democratically how the cash will be allocated, including how much will be paid to members, how much will be spent on managing the resource, or for community projects.

7. **All marketing should be open and competitive**

Free market principles should be used as much as possible and Government should assist with developing markets for wildlife without prejudicing producer prices. Any concessions for hunting, game viewing, or the like, should be marketed by the community competitively, using auctions, tenders, interviews or a combination of such techniques.

8. **Wild resources should not be taxed more heavily than other resources**

The management of game animals as a State resource has left a legacy of treating them as a communal asset and this results in wildlife being taxed unfairly compared with other resources. Failure to rectify this distortion leads to the mis-allocation of human resources among competing productive systems, to the disadvantage of wildlife, even where it is potentially the most profitable and sustainable use of the ecosystem.

9. Communities should not over-extend themselves

Communities should not embark on activities or investments that they cannot sustain without outside help. Living within their means might slow progress, but it builds on its own capacity to maintain itself. It avoids the problem of donor dependence.

10. Government is the ultimate authority for wild resources

There is no contradiction between Government being the ultimate authority for wildlife and devolving the responsibility to manage it to landholders. The people on the land are in the best position to manage it efficiently and should be encouraged to do so, while Government monitors the process to ensure it is sustainable.

11. Developing community management skills and systems

Devolving authority over wildlife to local communities and developing local management systems, and the skills to implement them, is a process that should be encouraged without coercion. Building up trust helps overcome what is often the major hurdle to development: the crippling attitude of helplessness and lack of confidence among rural people, and their dependence on the State.

12. Community-based natural resource management represents cooperation between local people and government, with government playing a special role

The role of government shifts from a director to the facilitator of sound management, through the provision of information and other support services like research and extension. In effect the State trades power for influence; a police force for an extension officer in a field where policing has been singularly expensive and ineffective.

First-hand environmental knowledge

The most salient and relevant features from this aspect of the literature review are summarized and expressed in Part III under the heading: **Mapping the first-hand environmental knowledge of KNP's enforcement personnel**. Summarized below are additional key points from Berkes, 1993; Eythorsson, 1993; and, Johnson, 1992.

- Traditional environmental knowledge, or TEK, can generally be defined as a body of knowledge built up by a group of people through generations of living in close contact with nature... it includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use.
- “*New biological and ecological insight*: Fresh insight can be derived from perceptive investigations of traditional environmental knowledge systems.

- *“Resource management:* Much traditional knowledge is relevant for contemporary natural resource management in areas such as wetlands, tropical moist forests, circumpolar regions, and dryland, high-altitude, and coastal areas.
- *“Protected areas and conservation education:* The “protected area” concept may be promoted to allow resident communities to continue their traditional lifestyles, with the benefits of conservation accruing to them. Traditional knowledge may be used for conservation education, especially where the local community benefits from the protected area.
- *“Development planning:* The use of traditional knowledge may benefit development agencies in providing more realistic evaluations of production systems, natural resources, and the environment.
- *“Environmental assessment:* The time-tested and in-depth knowledge of indigenous peoples about their habitat is a valuable resource in assessing the social and environmental impacts of proposed development projects.” (Johnson, 1992: 11-12)
- TEK is recorded and transmitted through oral tradition; Western science employs the written word.
- TEK is learned through observation and experience; Western science is taught and learned in a situation usually abstracted from the applied context.
- TEK is based on the understanding that earth, air, fire and water, which are classified as inanimate, also have a life force. Therefore, all parts of the natural world — flora, fauna, inanimate elements — are believed to have a spirit.
- TEK does not view human life as superior; all life forms are related and are interdependent.
- TEK does not grant humans the right to control and exploit nature for self-interest.
- TEK is holistic; Western science is reductionist. Science breaks down data into smaller elements to understand the whole; TEK views the whole and believes elements cannot be understood in isolation.

- **TEK is intuitive; Western science is analytical. TEK emphasizes emotional involvement and subjective understanding. Science emphasizes abstract reasoning and the need for objectivity.**
- **TEK is primarily qualitative; Western science is mainly quantitative. In TEK, detailed qualitative knowledge is gained through continuing intimate contact with the resource. Trends are emphasized over numbers (with respect to predicting future events). Western science focuses on numbers to build mathematical models to predict future events.**
- **TEK is based on data generated by resource users; it is more inclusive than Western science.**
- **TEK is based on diachronic data (long time series of information on one locality); Western science is based on synchronic data (short time series over a large area).**
- **TEK often has a reference to time and space but as points of reference that are different from scientific knowledge. Time may be referred to as different seasons or different weather patterns or phases of the moon. Space can be made up of different reference points or event localities.**
- **TEK is rooted in a social context that sees the world in terms of social and spiritual relations between all life forms. Relations are based on reciprocity and obligations toward both community members and other life forms. Western science is hierarchically organized and vertically compartmentalized; the environment is reduced to conceptually discrete components that are managed separately.**
- **TEK explanations of environmental phenomena are often spiritual and based on cumulative, collective experience. It is checked, validated, and revised daily and seasonally through the annual cycle of activities. Western science employs methods of generating, testing, and verifying hypotheses and establishes theories and general laws as its explanatory basis.**
- **The fundamental tenets of Western science — rational analytical thinking, objectivity, reductionism, and the Judeo-Christian ethic of human domination over nature — are**

being challenged for being ethnocentric, antiecollogical, and ignorant of the cultural dimension of technological development.

- The community must take responsibility for making decisions and assume responsibility for administering the TEK project. Any other process that gives “outsiders” these responsibilities runs contrary to the goals of participatory community research and is unlikely to lead to a fully satisfactory conclusion.
- There are many worthwhile avenues of traditional environmental knowledge to pursue; ultimately, however, it should be up to the community to decide what information should be collected and how it should be applied.
- From a methodological standpoint, it is difficult to design a method that can be applied by all interviewers and informants for all topics of investigation. Nevertheless, recognizing the number of variables involved in gathering information — such as differences in interviewers’ levels of expertise, the setting of the interview, and the personalities of interviewers and informants — is important for realizing the importance of flexibility and innovation to the research approach.
- The structured conversational approach to interviewing, supplemented by participant observation, may be the best method to document TEK.
- Where Western science and traditional knowledge diverge most notably is in their explanations of ecological processes and concepts of environmental management. Ideology is a fundamental element of subsistence, as important as practical empirical knowledge and appropriate technology.
- The fundamental principle of traditional environmental ideology is that the land and its resources should be tended for the benefit of future generations.
- On the one hand, TEK is utilitarian: what people know is directly linked to their survival on the land. On the other, knowledge, unlike survival, varies between individuals; some people are naturally more curious and observant than others and will have a different level of understanding about certain phenomena.

- TEK consists of a detailed knowledge of all the components of the natural environment and the practical and spiritual relationships of the individual to these components. TEK combines ecology and ideology in a harmonious relationship.
- For TEK to gain acceptance and for it to be recognized as a viable component of modern resource management, it must be documented and disseminated in a manner that is both meaningful and useful to appropriate audiences.
- Sufficient attention must be paid to deciphering the true meaning of foreign terms and concepts to determine whether there is an equivalent term existing in the scientific (and English) terminology. In comparing terminology among different languages and cultures, there may be some terms and concepts that have a one-to-one correspondence in both languages; however, there may also be some that do not exist in the other language or that have a slightly different meaning.
- Use culturally appropriate communication; i.e.: Western categories used as a framework for information collection might not be the most effective method to elicit traditional knowledge.
- Much of the knowledge is transmitted in the form of stories and legends using metaphors and sophisticated terminology; unless the interviewer is familiar with the stories and understands how to extract the ecological data from the narrative, an important source of information may be overlooked.
- A Technical Advisory Committee should be established to ensure a critical review of the research from a professional, refereed standpoint as well as to provide new ideas and insights into the work.

Indian wildlife conservation (law and enforcement)

The earliest codified law with respect to environmental preservation can be traced to the third century (B.C.) when King Ashoka of India enacted the following: "I [declare] that the following animals [are] not to be killed: parrots, mynas, the aruna, ruddy geese, the nandimukha, cranes, bats, queen ants, terrapins, boneless fish, rhinoceroses... and all quadrupeds which are not

useful or edible... Forests must not be burned.” (Wildlife Act, 1994: 15) India’s first codified law with respect to the protection of wildlife, however, was enacted in 1887 by the British, titled: the Wild Birds Protection Act No. X of 1887. (Wildlife Act, 1994: 15)

The Act enabled the government of the day to regulate the possession or sale of any kind of specified wild birds which had been taken during the breeding season; however, the act did not regulate as to the killing of the birds. In other words, the government was concerned with property rights in the animal, but not with its preservation. Furthermore, the Act did not address the killing of other wild animals. As a result of the unregulated slaughtering of birds and animals, myriad species teetered on the brink of extinction. In response, the Government passed the “Wild Birds and Animals Protection Act No. VIII of 1912.” (Wildlife Act, 1994: 15) The schedule to the Act, which listed the birds and animals that were not to be killed, consisted of: “antelopes, asses, bison, buffaloes, deer, gazelles, goats, hares, oxen, rhinoceroses, sheep and 16 species of birds.” (Wildlife Act, 1994: 15) For the first time in the history of India, killing or capturing of specified wild animals and birds was made a penal offence.

This Act was amended by the Wild Birds and Animals Protection Act No. XXVII of 1935, which finally meant that the law adopted and set aside sanctuaries for the protection and growth of wild animal and bird populations. Finally, in the late 1960s, concerned with rapidly declining wildlife populations inadequately protected by the laws of the day, the Indian Government began to discuss a more comprehensive law that would protect all wildlife and punish all offenders. Then, on September 9th, 1972, Parliament passed the Wildlife (Protection) Act No.53. (Wildlife Act, 1994: 18) The original form of this Act missed the mark, however, as it did not completely restrict the trade in trophies and animal articles; consequently, large scale poaching continued mostly unchecked.

It was not until 1976 that the Indian Constitution recognized wildlife with Parliament’s passing of the Constitution (Forty-Second Amendment) Act, and insertion of Article 48-A (w.e.f. 3.1.1977) in Part IV. Article 48-A reads: “The State shall endeavour to protect and improve the environment and to Safeguard the forests and wildlife of the country.” (Wildlife Act, 1994: 19)

The Amendment Act also incorporated a new chapter, Part IVA, specifying the fundamental duties of the citizens of India. These were expressed in Article 51A(g): "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures." (Wildlife Act, 1994: 19)

That same year, 1976, India embarked on another of its campaigns to safeguard its wildlife by joining the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); it ratified CITES on July 20th, 1976, and officially became a state party with effect on October 18th, 1976. (Wildlife Act, 1994: 19)

The final incarnation of the 1972 Wildlife (Protection) Act, at least with respect to rhino conservation, came in 1986 with Amendment Act No. 28. With this amendment Chapter V-A was inserted into the Act and a complete prohibition of trade or commerce in trophies and animals parts and products of scheduled wildlife came into effect (the One-horned Rhinoceros is listed at No.30, Part I, Schedule I). (Wildlife Act, 1994: 19)

Beyond CITES, Kaziranga and its rhinos receive further international legal support through India's participation in the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Park's status as a World Heritage Site as recognized by the UNESCO World Heritage Convention.⁶

⁶This will be discussed further in the Recommendations section.

International wildlife law & international law⁷

Compared to the ages-old trade in wildlife and wildlife parts and products, international wildlife law is in its infancy. The 1886 *Treaty Concerning the Regulation of Salmon Fishing in the Rhine River Basin*, between Germany, Luxembourg, the Netherlands and Switzerland, was the first international agreement respecting wildlife conservation. (Lyster, 1985) The trade in elephant ivory predates this historic event by centuries, and trafficking in wildlife-based remedies prescribed by practitioners of Traditional Chinese Medicine predates it by millennia. It is only in the last 25 years, however — due to unprecedented rates of species extinction and habitat loss, as well as a sea change in environmental ethics — that concluding international treaties to conserve wildlife has become both a regular and necessary act.

Recent conservation efforts, such as the 1973 *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), and the 1992 *United Nations Convention on Biological Diversity* (CBD), exemplify the international recognition of the need to intervene in national affairs with respect to regulating the protection of wildlife, particularly endangered and cross-boundary species. In fact, international law as a tool for wildlife conservation has never been more important than it is today, given the multi-million dollar industry built on a foundation of trade in animal parts that is threatening the survival of many species. (Mills, 1996: pers.com) It is vital to understand the strengths and weaknesses of this system if strategies are to employ international law to its greatest advantage as a tool for conservation.

⁷ In its earlier incarnation, this MDP was to have a significant legal component, as discussed in the SPECIES proposal (see APPENDIX 1). This aspect of the literature review was to serve as background to the international legal component of my original research. However, once it became clear that the most pragmatic intervention was one that could be implemented with a minimum of top-down governmental involvement and a maximum of hands-on, bottom-up field-staff involvement, I decided not to pursue the international legal component any further. My decision was guided by the practical limitations of my personal involvement in the intervention, and the realistic expectations of implementation. That is, I viewed the issues and potential solutions from the perspective of my own involvement. I asked the question, "What can I do to mark immediate and significant improvement in Kaziranga?" I decided the answer would involve putting the solution in the hands of the most directly affected stakeholders: the forest guards. A solution grounded in international legal mechanisms would put the solution in bureaucratic hands, and there is no guarantee that the forest guards themselves would feel any direct improvement in their immediate situation. Furthermore, I was reasonably certain that I would not have much success in effecting any significant or immediate changes on the ground and in the men's morale by designing a strategy focusing on international law. For these reasons, then, research into an intervention based on international law did not proceed past this stage of the literature review.

What power does international environmental law have to effect meaningful conservation?

International law as a mechanism for wildlife conservation is often greeted with skepticism. On the surface there is good reason to question its efficacy as it raises the question of how a state can be made to comply with international law in the absence of a supranational police force and system of enforceable sanctions. (Saunders, 1996: pers.com.) On one side of this issue is the question of whether international law really is law at all; on the other is the belief that international law is no different than any other branch of law, in that if every state acted independently and without regard for other states, the international community would fall into chaos. (Akehurst, 1970)

The consequences of independent action would nowhere be more dire than if each state were to govern its relationship with the environment without due consideration for cumulative impacts felt by every other state.⁸ The environment is, in effect, a commons of renewable, non-renewable and continuing resources.

Provided that each of the users in this commons limits itself to sustainable consumption, with respect to the other users, the commons will maintain an equilibrium set by the forces of nature. However, if each of the users attempts to maximize its consumption, without consideration of cumulative impacts respecting like consumption of every other user, as has been the case in contemporary society, the commons will collapse. Recognizing that "freedom in a commons brings ruin to all," (Hardin, 1968: 1244) the growing field of international environmental law acknowledges the inextricable links between every element of the biosphere, humans included, in its attempts to manage our environmental impacts. In fact, the power of international law to manage the environment holistically, rather than in a piecemeal fashion by isolating its individual components, may make it a more effective and meaningful conservation tool than municipal law.

Perhaps, because international law is a result of consensus among sovereigns, unlike municipal law, it is more likely to be effective and the skepticism that surrounds it may be unfounded. In assessing the power of international law to effect meaningful wildlife conservation,

⁸ It should be noted that the notion of "independence" does not imply sovereignty; rather, it refers to a lack of cooperation and consensus among states with respect to action.

and consequently the issue of whether international wildlife law really is law, an exploration of the development and sources of international law must lead off the discussion.

The sources of international law

Article 38(1) of the Statute of the International Court of Justice sets out the definitive statement on the sources of international law as:

- (a) international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
- (b) international custom as evidence of a general practice accepted as law;
- (c) the general principles of law recognized by civilized nations;
- (d) ...judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.⁹

Article 38 provides three means of creating law — through conventional law, customary law, and general principles of law; and, two means of identifying law — through writings and judgments.

Conventional international law is created when a state binds itself to obligations with one or more states by way of a treaty, convention, agreement, or any instrument governed by international law that it has ratified. The strength of conventional international law lies in its consensual origin. Even in the absence of a police force, *per se*, conventional international law is often more effective than municipal law because states create the law to serve their best interests; the law is not created externally and forced upon them.

Customary law is established by consistent state practice, and the acceptance of the states that they are complying with these rules because they believe they are bound by them (*opinio juris*) (Saunders, 1996: pers.com.). Although many norms of customary international law typically evolved over a long period of time, given modern advances in technology (particularly in communications, defence, and transportation), and environmental urgency, customary law is now accepted as being capable of evolving quickly. (Hughes *et al*, 1993)

⁹ Statute of the International Court of Justice, art.38, 1977 I.C.J. Acts & Docs. 77.

General principles, the third source of international law, was inserted in the statute lest gaps in treaty law and customary law would render the International Court of Justice (formerly, the Permanent Court of International Justice) incapable of coming to a decision. (Akehurst, 1970) It is widely accepted that “general principles” are drawn from international law; however, there is some controversy over whether it refers to general principles drawn from national law. Perhaps in accepting that general principles of law can be drawn from either realm, the odds of finding appropriate points of law to fill those gaps improve. (Akehurst, 1970)

The last clause of Article 38(1) refers to judicial decisions and the teachings of learned writers as subsidiary means for determining law. Though the direction respecting judicial decisions was made subject to the provisions of Article 59, that “the decision of the Court has no binding force except between the parties and in respect of that particular case,” (Akehurst, 1970: 36) these decisions are often considered as the identification and/or affirmation of customary law. As for the teachings of learned writers, research and scholarship continue to structure the framework of legal discussion, and writings do offer a “comprehensive, succinct and impartial summary of state practice.” (Akehurst, 1970: 37)

Having identified the primary sources of international law, it is important to discuss them within the context of international environmental law, and to consider new sources of law, as well.

The nature of environmental law

It is important to distinguish between international law in general, and international environmental law, in particular, as a distinct category of the former. International law is most commonly described as a system of principles and rules that governs relationships between states and other internationally recognized persons. (Hughes *et al*, 1993) International environmental law is described as a system that aims to “protect the biosphere from major deterioration which could endanger its present or future functioning.” (Kiss *et al*, 1991: 9)

This distinction is significant, particularly respecting the purpose of international environmental law, as states are seen as exercising functions necessary to protect the common interests of humanity, rather than as possessing inherent sovereign rights which are exercised out

of self interest. (Kiss *et al*, 1991) Nonetheless, early environmental law efforts did not accord environmental components with intrinsic value; rather, conservation was aimed more precisely at satisfying the anthropocentric and economics-based Lockean proviso that there be “enough and as good left in common” (Nozick, 1974: 174) for future generations.

This prevailing anthropocentrism of the early 1970s is reflected in the 1972 *Stockholm Declaration on the Human Environment*: “The natural resources of the earth... must be safeguarded for the benefit of present and future generations through careful planning... .”¹⁰ (Kiss *et al*, 1991: 10) This approach had its shortcomings, however, as the law in fact permitted consumption of natural resources that destroyed options for others of the time (developing nations) as well as for future generations.

The notion of the environment as having an intrinsic value was first recognized in the preamble of the 1979 *Convention on the Conservation of European Wildlife and Natural Habitats*¹¹ (the Bern Convention), in the statement “that wild flora and fauna constitute a natural heritage of aesthetic, scientific, cultural, recreational, economic and intrinsic value that needs to be preserved and handed on to future generations.” (Kiss *et al*, 1991: 10) Though this was an improvement over earlier efforts, there was still an unmistakable link between environmental value and environmental consumption.

The sea change in valuing the environment did not occur until 1982, with the proclamation of the *World Charter for Nature* by the United Nations General Assembly. This document marked a significant shift in our legal and moral recognition of environmental value, from our earlier consideration of the environment as a storehouse of commodities, to an enlightened acknowledgment of the environment’s intrinsic worth.

*Every form of life is unique, warranting respect regardless of its worth to man and, to accord other organisms such recognition, man must be guided by a moral code of action.*¹²
(Kiss *et al*, 1991: 11)

¹⁰ Principle 2, Stockholm Declaration on the Human Environment, 1972, U.N. Doc. A/CONF.48/14/Rev.1 (U.N. Pub. E.73.IIA.14)(1973)

¹¹ Preamble, para.3, Convention on the Conservation of European Wildlife and Natural Habitats (Bern, September 19, 1979), E.T.S. 104.

¹² Preamble, para.3(a), World Charter for Nature, G.A. Res.37/7, 37 U.N.G.A.O.R. Supp. No. 51 at 17, U.N. Doc.A/37/51 (1982)

Despite that this still did not confer legal status on the environment, it did place it under the aegis of morality. Furthermore, the preamble's recognition that "mankind is a part of nature and life depends on the uninterrupted functioning of natural systems," marked a sharp secularism of jurisprudence. Man was no longer viewed as above or apart from nature, but as an inextricable part of nature. The significance of this should not be underestimated, as it is one of the earliest legal acknowledgments of the need to preserve ecosystem integrity.

Conventional international law and the environment

Prior to the CBD's development of a general treaty for the protection of the global environment, including genetic diversity and the regulation of the effects of genetic engineering on the environment, conventional environmental law was concerned with policing the air, non-marine waters, oceans, and wild plants and animals. This gave rise to a number of provisions common to conventional environmental norms, which were set in place to establish: (Kiss *et al*, 1991: 97)

- (1) implementation measures to be taken by the contracting parties;
- (2) supervisory mechanisms to review implementation and compliance with agreements;
- (3) procedures to facilitate and ensure that agreements remain contemporary with respect to the rapidly changing nature of environmental problems;
- (4) action plans for further measures; and,
- (5) mechanisms of cooperation, either by the creation of new institutions or the utilization of existing ones.

Each of these general provisions will be discussed with respect to their application to CITES.

Implementation measures

International environmental treaties often place responsibilities on municipal law by requiring that states take specific internal actions to implement or fulfill their treaty obligations. Measures of implementation are most significant to the general framework of international environmental law, as they may oblige states parties to implement penal legislation against persons

committing treaty offenses. CITES, article VIII(1), for example, orders parties to take appropriate municipal legislative “measures to enforce the provisions of the present Convention and to prohibit trade in specimens in violation thereof...” including measures to penalize offenses. (Lyster, 1985)

Supervising implementation

Under Article 26 of the *Vienna Convention on the Law of Treaties*, states parties must observe their treaty obligations and perform them in good faith. Generally speaking, through a process of monitoring and reporting states supervise one another and themselves. (Saunders, 1996: pers.com.) In some treaties, certain states parties can be named as watchdogs to supervise implementation,¹³ but in most cases self-policing is all that is required. (Kiss *et al*, 1991: 458)

The administrative structure of CITES comprises a Secretariat (Article XII), Management and Scientific Authorities (Article IX), and the regular (usually every two years) Conference of the Parties (Article XI). In practice, this watchdog hierarchy is as important to the enforcement of CITES as measures under Article VIII, as it ensures monitoring of the Convention on both international and national levels. (Lyster, 1985)

The mere fact of having to present reports at regular conferences of the parties often exerts sufficient influence with respect to implementation. The strength of international law is both psychological and political, particularly respecting the sensitive field of the environment where states increasingly seek to garner a “green” reputation. (Kiss *et al*, 1991)

Facilitating amendments

It is imperative that international law recognize that the environment is not static. The state of the environment may change rapidly, and therefore the law must be able to adapt to the requirements of environmental protection. This seems on the surface to present a conflict for law, an essential characteristic of which is the stability and predictability of its rules.

¹³ Art.218 of the U.N. Convention on the Law of the Sea, U.N. Doc. A/Conf 62/22 (1982). Paragraph 1 states: “When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may undertake investigations and, where evidence so warrants, institute proceedings in respect of any discharge from that vessel outside the internal waters, territorial sea or exclusive economic zone of that State in violation of applicable international rules and standards established through the competent international organization or general diplomatic conference.”

The resolution rests in establishing stable general obligations, as well as flexible provisions which may include, for example, a detailed listing of species or substances or activities in the annexes or appendices that can be modified according to environmental need without amending the principal treaty. As the annexes are an integral component of the treaty, however, the modification procedure must be expressly included in the treaty's provisions. (Kiss *et al*, 1991)

CITES, for example, sets out provisions expressly describing actions parties may take to ensure the Convention remains contemporary. Article XV, 1(a) states that "any Party may propose an amendment to Appendix I or II for consideration at the next meeting." Article XVI, 1 states that "any Party may at any time submit to the Secretariat a list of species which it identifies as being subject to regulation within its jurisdiction for the purpose mentioned in paragraph 3 of Article II. And, Article XVII, 1 states that "an extraordinary meeting of the Conference of the Parties shall be convened by the Secretariat on the written request of at least one-third of the Parties to consider and adopt amendments to the present Convention." (Lyster, 1985: 399)¹⁴

Future considerations and action plans

The nature of environmental problems often makes it impossible to define exact and effective obligations; this is particularly true of long-range and transboundary issues respecting pollution or wildlife migration, for example. Rather than establish precise duties, conventional environmental law may oblige parties to cooperate in the field of research, and to implement a common program of monitoring and feedback.

Treaties containing action programs may provide for a set of fixed obligations through the conclusion of protocols to the original text. These provisions respecting future considerations indicate the kinds of cooperation, and, often, the means required of parties to achieve treaty goals. (Kiss *et al*, 1991)

With respect to CITES, the Secretariat is responsible under Art.XII (2) for facilitating and implementing any actions pursuant to recommendations made at a Conference of the Parties.

¹⁴ Convention on International Trade of Endangered Species of Wild Fauna and Flora (1973)

Mechanisms of cooperation

The importance of acquiring new knowledge, sharing information and analyzing the biosphere requires permanent cooperation. For this reason, many environmental protection treaties contain institutional provisions conferring specific powers on international organs, such as: managing the Convention, collecting and disseminating information, and supervising enforcement of the Convention's norms by states parties.

Another function of the cooperative machinery is to resolve differences between states parties, and to facilitate dispute resolution where a satisfactory resolution is not concluded. It is estimated that one in six environmental treaties contains recourse to arbitration; these will usually also detail a regulatory scheme in a protocol or annex respecting the arbitration procedure. (Kiss *et al.*, 1991)

With respect to CITES, administrative duties fall on the Secretariat and the Management and Scientific Authorities. As well, the Convention makes provisions for dispute resolution under Article XVIII, instructing parties, where negotiation fails, to submit the dispute to the Permanent Court of Arbitration at The Hague (Netherlands).

Customary international law and the environment

Traditionally, it was believed that customary law required years to evolve. However, given technology and environmental urgency, waiting years for customary environmental norms to develop is unreasonable. In fact, despite the relative youth of environmental law it is possible to discern among current norms, particularly with respect to transfrontier pollution and a growing body of international wildlife law, evidence of general practice accepted as law.

At times, custom is developed during the long process from negotiation to codification — as was the case with the United Nations Conference on the Law of the Sea (though UNCLOS was as much progressive development). (Saunders, 1996: pers.com.) During the negotiation process from 1973 to 1982, consensus was reached identifying a number of practices as international customary norms, despite the fact that the treaty had not yet been adopted. (Saunders, 1996: pers.com.)

A process seems to have evolved that is helping to formulate a number of emerging rules of customary international environmental law. (Kiss *et al*, 1991) This process includes: the formulation of nonbinding principles (this will be discussed under the heading: Evolving sources of international environmental law); the repetition of specific rules in international texts; and, the formulation of a rule that may or may not have been applied by different states. (Kiss *et al*, 1991) This last example is best seen in the context of the legal follow up to the Chernobyl nuclear accident. One of the rules that had emerged from prior state practice, due largely to conventional requirements, was the obligation to “urgently notify states at risk of having their environment adversely affected.” Soviet non-application of this rule resulted in the norm being explicitly formulated in the *Vienna Convention on Early Notification of a Nuclear Accident (1986)*. (Kiss *et al*, 1991)

The *Declaration of the United Nations Conference on the Human Environment* has formulated a number of fundamental customary norms of international environmental law, including: Principle 21, that states have the sovereign right to exploit their own environmental resources insofar as activities within their jurisdiction do not cause damage beyond their jurisdiction; and, Principle 24, that states cooperate both to improve the environment, and to control, prevent, reduce and eliminate adverse environmental effects. Both of these principles have been reaffirmed in a number of binding and nonbinding international instruments.¹⁵

General principles of international environmental law (Recognized by Civilized Nations)

The underpinnings of this source rest in identifying legal principles, with respect to the environment, common to the major legal systems of the world. In light of technology’s expansion of the global neighborhood, and consequently the ever-shrinking “small world,” and particularly the scientific recognition of the environment as a series of conjoined ecosystems, eventually global proliferation of national environmental legislation may provide a sufficiently broad and fine net to

¹⁵ The general obligation to co-operate can be found in: UNGA No. 2995 of 15 December 1972 on Co-operation between States in the Field of Environment; UNGA Resolution No. 37/7 of 28 October 1982 on the World Charter for Nature (Article 21); 1982 UNEP Gov. Council Nairobi Declaration (Article 10); 1979 OECD Governments’ Declaration of Anticipatory Environmental Policies (Paragraph 10) (In: Environmental Protection and Sustainable Development: Legal Principles and Recommendations. Graham & Trotman/Martinus Nijhoff Publishers. 1987.

catch most issues falling through the gaps in conventional and customary international law. Already, certain general principles may be considered as established, such as preventing environmental damage, making reparations for environmental damage, and protecting endangered species. (Kiss *et al*, 1991)

Evolving sources of international environmental law

In exploring new and evolving sources of international environmental law, it is important to make the distinction between “hard” and “soft” law. Hard law refers to firm and binding rules of law. Traditionally, and by definition, law is compulsory, or it does not exist. Treaties, as well as the provisions of customary law, are considered “hard” law, and parties are bound by them. (Lyster, 1985) “Soft” law typifies the type of regulatory conduct seen in resolutions issuing from conferences or international organizations that, because it has not been expressly laid out in the treaty, is not binding in the same sense as hard law.

There seem to be three primary reasons for the development of soft law as a source of international wildlife law. In step with international environmental norms, soft law evolved out of and in response to (i) the development (post W.W.II) of a community of permanent institutions and non-governmental organizations as a forum for on-going economic, environmental and political negotiations; (ii) the diversification of the world community and the arrival of developing nations on the world stage, which has forced the renegotiation and adaptation of many international customary norms codified before these states had sovereignty; and, (iii) rapid evolution in the fields of economics, communications and technology, and increasing state interdependence with respect to these developments. (Dupuy, 1991)

Soft law, and its manifestation in nonbinding resolutions, is a recognition of the need for a new type of law, as existing international environmental law is either too difficult to be applied by developing nations, or too rigorous and conservative to adapt to the rapidly evolving areas it is supposed to regulate. In essence, it is a “symbol of contemporary times and a product of necessity.” (Dupuy, 1991: 422)

Nonbinding resolutions, primarily comprising directive recommendations, programs of action, or declarations of principles, (Kiss *et al*, 1991) have been described as “rules which have to be considered as law insofar as they fix norms with which States should comply, but which cannot be enforced in the traditional meaning of the term.” (Kiss, 1978: 23) They are significant as a mechanism of international wildlife law, as it is common for wildlife treaties to require their parties to hold regular meetings to make recommendations with respect to improving implementation.¹⁶

Furthermore, as discussed above with respect to customary international law, the formulation of nonbinding principles, as well as the repetition of specific rules in international texts, often builds consensus which leads to general acceptance of the rule in state practice. Moreover, there are cases where the provisions of a nonbinding resolution have been so precisely formulated that, aside from cautious wording using *should* instead of *shall*, the document could easily be mistaken for, or integrated into, a treaty. (Dupuy, 1991) Nonetheless, because of soft law’s nonbinding character, it is not seen as codifying or creating a legal obligation in international law.

When does “soft law” harden?

If soft law may be considered “transitional” law, or soft guidelines that are on their way to becoming hard law, then repetition — as in any customary lawmaking process — is key to evaluating the power of a nonbinding resolution. “Cross-references from one institution to another, the recalling of guidelines adopted by other apparently concurrent international authorities, recurrent invocation of the same rules... all tend to... establish a common international understanding.” (Dupuy, 1991: 424)

In addition to understanding that soft law is significant in that it has the potential to become hard law in the future, it is also important to remember that states join international organizations of their own volition. As such, the recommendations formulated within nonbinding resolutions constitute an indication of the attitude of the parties with respect to compliance. “If [states]

¹⁶ CITES Art.XI orders the Secretariat to call regular conferences of the Parties, one of the functions of which is to “make recommendations for improving the effectiveness of the present Convention.” (Art.XI, 3(e)).

systematically refuse to accept the recommendations of the organs [of international organizations they join], one may wonder why they still retain membership.” (Kiss, 1991: 24)

These soft-law resolutions often share a number of guiding principles which have become standard fare in resolutions respecting the environment. The most common of these is the recurring principle of information and consultation. Another recurring principle recommends that states take an ecosystem approach to conservation, by way of establishing cooperative bilateral and multilateral arrangements to manage shared species and protected habitats with common boundaries in order to achieve more effective control of illegal transborder movement of wildlife, their parts and their derivatives. These documents often stress the need to avoid discriminating between their own environment and that of other states, with respect to the elaboration and application of laws and regulations as regards protecting wildlife and controlling the trade therein. Moreover, these agreements emphasize the need to implement and comply with CITES. Finally, many of these non-binding resolutions urge that parties develop national and local educational campaigns with respect to ecosystem integrity and the impact of cultural practices on wildlife, as well as strategies to implement the recommendations in a socially meaningful manner.

The recurrence of, consent to and compliance with these principles raises the issue of whether, despite their soft nature, non-binding wildlife resolutions meet the two-pronged customary international law test of state practice and *opinio juris*. Additionally, these recurring principles, which, when evident, clearly indicate a common international understanding, accord with three broad principles of international environmental law: information and consultation, non-discrimination, and the global approach. (Dupuy, 1991) (There is a fourth broad principle describing common procedures for conducting environmental impact assessments, but this is directly related to the principle of information and consultation.)

The principle of information and consultation has been reiterated for more than thirty years. It includes clauses respecting: exchange of information; prior notice of planned activities; environmental impact assessments; and co-operative arrangements for environmental assessment

and protection,¹⁷ and can be found in documents such as: the 1978 UNEP Draft Principles of Conduct on Shared Natural Resources; (Dupuy, 1991) the 1960 Indus Waters Treaty (Article 7(2)); the 1983 Agreement between Canada and the United States to Track Air Pollution across Eastern North America (Acid Rain Research); and, the 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources (Articles 18(2)(f), 19(2)(d) and (g) and 20(3)(b)).

The principle of non-discrimination, which holds that states should not substantially differentiate between the elaboration and application of laws respecting their own environment and that of other states, can be found in OECD Council recommendations respecting transfrontier pollution, including: the 1974 OECD Council Recommendation C(74)224 concerning Transfrontier Pollution (Annex Title C); the 1986 OECD Council Decision-Recommendation C(86)64(Final) on Exports of Hazardous Wastes from the OECD Area (as part of the binding decision of the OECD Council)¹⁸. (This principle gained “hard law” status in the 1982 UN Convention on the Law of the Sea.) (Dupuy, 1991)

Lastly, the global approach principle, essentially recognizing the need to cooperate internationally to consider cumulative impacts to a global ecosystem, is at the very heart of the 1992 United Nations *Convention on Biological Diversity*. The obligation placed on states to maintain ecosystems and related ecological processes essential for the functioning of the biosphere can also be found in various resolutions adopted by the OECD Council of Ministers, including OECD Council Recommendations C(73) 172(Final), C(74)219, C(74)221, C(78)4(Final), or OECD Council Decision C(73)1(Final).¹⁹

It appears that a case may be made for the interpretation of these principles as customary norms in light of a general acceptance of these basic principles as law among the international community. In this sense, based on the elements of practice and *opinio juris*, these principles might already be considered as customary law. This proposition seems to be supported by an observation of the International Court of Justice made in 1986, with respect to a number of

¹⁷ Articles 15-18: Environmental Protection and Sustainable Development.

¹⁸ Article 13: Environmental Protection and Sustainable Development.

¹⁹ Article 3: Environmental Protection and Sustainable Development.

resolutions adopted by the UN General Assembly, that the “effect of consent to the text of such resolutions ... may be understood as an acceptance of the validity of the rule or set of rules declared by the resolution by themselves.” (Dupuy, 1991: 432)

This raises the final issue of compliance and enforcement: if non-binding resolutions have power, how can it be tapped?

If the law has power, how can it be tapped?

It is important to discuss the issue of compliance, not with respect to negotiation among parties, but from the perspective of an international non-governmental organization. Though mechanisms of dispute resolution exist, as well as legal sanctions, they are often not particularly satisfying with respect to forcing a state to alter its conduct to accord with the law. A state can be “taken to court,” however the problem lies not in securing a satisfactory judgement, but in having all parties agree to submit to the court in the first place. (Saunders. 1996: pers.com.) In light of the involvement of international non-governmental organizations in wildlife conservation²⁰, the issue should focus on how an INGO concerned with conservation can force a state (e.g.: a party to CITES) to comply with its international legal obligations.

Perhaps the key is in the fact that treaties are normally implemented by national legislation, which is considerably easier to enforce than international law. A conservation group such as TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce) or the Wildlife Protection Society of India, for example, has no standing in the International Court of Justice but may, pursuant to the domestic law implementing a treaty, be able to force its government to comply with an international treaty by bringing an action in its national courts. (Lyster, 1985)

This was successfully attempted in 1981 by a US conservation group in *Defenders of Wildlife, Inc. v. Endangered Species Scientific Authority*. The *Defender of Wildlife*, a private conservation organization, contended that the US Scientific Authority did not have adequate scientific data to support its finding that the proposed level of export of bobcat pelts for the 1979-80 season would not be detrimental to the survival of the species. The bobcat is listed on

²⁰ Because INGOs often bring the power of public opinion to bear on both the issues and state conduct, they may be a greater force for conservation than the states parties.

Appendix II of CITES. The US Court of Appeals for the District of Columbia ruled in favour of the *Defenders*, holding the export quotas set by the Scientific Authority invalid, on the basis that a valid no-detriment finding cannot be made without a reliable census, and a reliable harvest estimate. The Court found that until such information is obtained, export of bobcats cannot be authorized. (Lyster, 1985: 252) Though the decision of domestic courts is not binding on other parties (to CITES, in this case), the decision should carry some weight in similar circumstances. (Lyster, 1985)

Conclusion

Given the ever-changing needs of the environment, particularly with respect to endangered species, it appears that the difficulty in elaborating specific obligations in the formulation of international conventions (treaties, etc.) can be overcome by the use of nonbinding resolutions.

Though at first glance it appears that this mechanism may weaken the positive effect of international law on conservation, in fact, through a consistent practice of reiterating general principles of conservation in nonbinding texts, a body of soft law norms is rapidly evolving into tomorrow's binding custom.

PART II — FINDINGS & INTERPRETATION

The findings and their interpretation focus on factors relevant to rhino poaching and conservation enforcement in Kaziranga National Park.

Chapter 6 — The Park

Since Kaziranga's earliest designation as a Reserved Forest in 1908 (at that time it occupied approximately 226 km² of Assam's land), it has been promoted through the conservation ranks to a Game Sanctuary (1916) and then to a Wildlife Sanctuary (1950), and finally in 1974 it was promoted to its current rank of National Park (*see Box 1*). KNP now spreads over approximately 430 km², lying between 26° 30' and 26° 45'N and 93° 5' and 93° 40'E, in Golaghat, Naogaon and Sonitpur districts of Assam (*see Figure 1*). (Assam Forest Department, 1996: 2) The promotion from Reserved Forest to National Park is significant as it marks a recognition of the need to intensify the level of protection maintained at KNP.

Box 1

Classes of protected area related to rhinoceros conservation in India

Unclassed Forest — Unprotected forestlands belonging to the State or the people.

Reserved Forest — Protected forest owned by the State. It receives the lowest levels of protection and permits can be given out for tree felling, grazing, fishing, etc. However, once declared a reserved forest, land cannot be diverted for non-forest purposes.

Wildlife Sanctuary — The notification of an area as a wildlife sanctuary (earlier called a Game Sanctuary) gives it a higher level of protection than a reserved forest. There is restriction on entry into a sanctuary and a permit is required for grazing, fishing, etc. Permits are given only to local villagers whose lives and livelihoods are tied the land.

National Park — The highest level of protection that a reserve is afforded for its ecological value. No trespass or utilization of resources is permitted within a national park. The strictest penalties are levied if any offence is committed within a national park.

Tiger Reserve — This could be a sanctuary or a national park, and in most cases includes areas of each. It is an area demarcated as falling within the administrative purview of *Project Tiger*, India's Tiger conservation programme, in place since 1973.

Source: Menon, 1996: 10

KNP has four range headquarters at Agaratoli, Kohora, Baguri and Burapahar. While the first three govern the eastern, central and western ranges of the park respectively, the Burapahar range oversees parts of the semi-hilly area adjoining the Karbi Anglong hill districts. (Bonai, 1997:

pers.com.) The park is bound on the northern side by the Brahmaputra River and on the southern side by National Highway 37. Additionally, two tributaries of the Brahmaputra, the Jiya Difloo and the Mora Difloo vein through and around Kaziranga creating numerous channels and *beels* (shallow lakes and watering holes) in the park (see Figure 1).

During the monsoon season these watercourses effect an annual submergence of parts of KNP; in particularly wet years the submergence has assumed (and presumably will continue to assume) flood proportions. (Assam Forest Department, 1996) The submergence, which is due to the high flood level of the Brahmaputra River and spells of heavy showers in the southern Karbi Anglong hills, serves a number of functions vital to KNP, including: flushing out the waterways, keeping water hyacinth (*Eichornis crassipes*) in check, and maintaining the park's grasslands. (The water hyacinth acts as an inhibitor to water birds.) (Menon, 1996) Moreover, as the various waterways and *beels* in KNP serve as breeding grounds and nurseries for the park's enormous fish population, the annual floods help in replenishing the Brahmaputra's fish stock. (Sharma, 1997: pers.com.)

The submergence is not uniform throughout the Park and typically the southern and western regions are the first to be affected while the central range is the last to flood. (Assam Forest Department, 1996) In earlier years there were escape routes for the park's wildlife via inter-connecting corridors of vegetation leading to the southern high hills, but with more and more areas being opened up and subjected to habitation and cultivation in the areas adjacent to the southern parts of KNP in both the plains and hills, the escape routes have been cut off. (Boro, 1997: pers.com.) This has led to negative interactions between villagers and wildlife during the annual exodus from the flood. Given that homes in the villages are constructed mostly from natural materials (bamboo and mud), they do not easily withstand encounters with some of the larger species, such as rhinos and elephants. (Das, 1997: pers.com.)

The annual floods also contribute to the mortality rate among many species, particularly the deer population. However, as there has not been a sharp decline in total population figures, the flood-related mortality is believed, indirectly at least, to assist in maintaining healthy stocks.

(Menon, 1996) All of the herbivores suffer due to a paucity of food during the flood season.

(Sharma, 1997: pers.com.)

Though these conditions make living and working in KNP a miserably uncomfortable task for the forest staff, they create good rhino habitat. KNP comprises three primary habitat types: 65% wet, alluvial grasslands (especially in the Kohora and Baguri ranges); 27% woodlands (especially in the Agaratoli range); and, 8% wetlands, which are integral to maintaining both of the other forms of habitat. (Menon, 1996: 11)

The climate is monsoonal, as previously mentioned, with a mean annual rainfall of 1828 mm, 90% of which falls between April and October. (Menon, 1996: 11) The floods inundate almost the whole of the alluvial plain habitat from June to October, and even in December much of the lower lying ground is submerged. During the dry season the tall grassland is burned by the KNP staff to encourage the growth of young grasses. These floods and (now man-made/controlled) fires have helped to maintain the habitat as it is now for thousands of years. (Menon, 1996)

Elephant grass and other associated grass species constitute the most important flora of the area. These include: *Imperata cylindrica*, *Arundo donax*, *Saccharum spontaneum*, *Phragmites karka*, *erianthus ravanio*, *Saccharum naranga*, *Erianthus filfolius* and *Cymbopogon* spp. Aquatic vegetation, such as *Eichornia* spp., *Andropogon* spp., *Ipomoea* spp., *Enydra* spp., *Pistia* spp., *Lomna* spp., *Nymphia* spp. and *Nelumba* spp. occupy the wetland niche, while the most predominant trees in the area are *Bombax ceiba*, *Lagerstroemia parviflora*, and *Albizia procera*. (Menon, 1996: 11)

Kaziranga's key mammalian species include: Rhinoceros (*Rhinoceros unicornis*), Tiger (*Panthera tigris*), Elephant (*Elaphus maximus*), Leopard (*Panthera pardus*), Wild Buffalo (*Bubalis bubalis*), Swamp Deer (*Cervus duvaucelli*), Hog Deer (*Axis porcinus*), Sambar (*Cervus unicornis*), and Wild boar (*Sus serofa*). (Assam Forest Department, 1996: 6) KNP's rhino population represents roughly 70% of the world's population of the One-horned Rhinoceros. (EIA, 1996: 26) Moreover, it is also home to a third of the world's wild buffalo, and half the

world's swamp deer. (Bonal, 1997: pers.com) These swamp deer may be a unique subspecies representing 90% of the world's population. (EIA, 1996: 26) Hundreds of thousands of birds visit the area and in the summer when KNP floods, river dolphin move in from the Brahmaputra River. (Wright, 1997: pers.com.)

Chapter 7 — The One-horned Rhinoceros

Population viability/habitat suitability

My motivation in selecting Kaziranga National Park as my case study was initially based on information obtained during interviews regarding the uncommon dedication and commitment of the enforcement personnel there (relative to that of the men at other parks where the conditions were not quite so distressed). (Wright, 1997: pers.com.) From an ecological and pragmatic perspective, the issue that must be addressed, then, is whether Kaziranga is the best candidate for an intervention designed to enhance the survivability of the One-horned Rhinoceros as a species (and not just as a population). There are two considerations that must be examined in answering this question: Population viability, and habitat suitability.

About 2,200 individual One-horned Rhinoceroses survive in seven protected areas in India and two in Nepal. (Menon, 1997: pers.com.) There is no viable population of One-horned Rhinoceros outside these protected areas. (Khan, 1989) About 1,500 individuals survive in less than 1,300 km² of fragmented habitat in India. About 1,200 to 1,300 of these live within the 430 km² of Kaziranga's boundaries. (Menon, 1996: 4) For the sake of comparison, India's second-largest rhinoceros population is in Orang Wildlife Sanctuary, also in Assam, with an estimated 90 to 100 rhinoceroses. (Menon, 1996: 41)

According to evaluations made during the 1986 Population Habitat Viability Assessment (based on a model created by the IUCN/SSC Conservation Breeding Specialist Group), of the 138 one-minute grids into which KNP was divided, 37 had high suitability for rhinos, 94 had moderate, and seven had low suitability. (Menon, 1996: 12) The study determined that KNP ranks very highly among protected areas in India, and given that KNP is home to the single largest One-horned Rhinoceros population in the world, clearly the species' success in Kaziranga is key to its survival or extinction. (Menon, 1996)

Table 1
Carrying capacities of rhinoceros bearing protected areas in India

Location	Current rhinoceros population	Potential carrying capacity	Habitat availability Present area (in km ²)	Habitat availability Potential area (in km ²)	Protection status
Kaziranga	1200-1300	1500	430	900	NP
Orang	90-100	under 150	76	76	WLS
Manas	12	under 100	500	500	NP
Pabitora	68-76	over 70	18	40	WLS
Laokhawa	0	over 50	70	70	WLS
Pockets in Assam	20	?over 100	508	508	Insecure
Katarniaghat	4	10	20	20	WLS
Dudhwa	13	under 100	490	490	NP
Jaldapara	35	over 150	216	225	WLS
Gorumara	18	over 50	79	100	NP
TOTAL	1407-1523				

Source: Menon, 1996: 54

A 1989 study distinguished three categories of viability for Asian rhinoceros populations:

Reasonable viability; Limited or Uncertain viability; and, Inviabile or "doomed." (Khan, 1989;

Menon, 1996: 54)

Reasonable viability

A minimum number of 100 rhinoceroses seems to be indicated by the Population Viability Analysis (PVA) for a population to be genetically and demographically viable for periods of time in the order of 150 years. To maintain such populations, areas of at least 100 km² will be required in the productive riverine habitats frequented by the Great One-horned Rhinoceros. Naturally, area requirements may also vary somewhat depending on the actual carrying capacity of a particular habitat.

As of 1995, KNP is the only habitat with a population confirmed to be more than 100 individuals. Orang recorded exactly 100 animals in 1993, but the sanctuary has an area less than 100 km² (76 km²) and a potential carrying capacity of little more than 100 animals (*see Table 1*). As such, according to Khan's terms above, KNP is the only habitat that can be described as having a reasonably viable population of the One-horned Rhinoceros. (Menon, 1996: 54)

Limited or Uncertain Viability

Populations with fewer than these numbers of rhinoceroses, actually or potentially, may have shorter-term viability and value for the preservation of the species. Periodic artificial migration (i.e. managed movement) of rhinoceroses between smaller populations may effectively render them a single larger population and would thereby enhance the viability of such remnant rhinoceros populations, as discussed further. However, the cost of such operations will be high and their success uncertain.

Realistic cost-benefit analyses need to be performed on each of the rhinoceros populations of limited viability to determine if intensive and interactive management is

feasible in both logistic and economic terms. This cost-benefit analysis should, above all, demonstrate that attempts to preserve these smaller remnants of rhinos do not divert or dissipate resources needed to protect the larger, reasonably viable populations.

Save and except for Kaziranga (and perhaps Gorumara, discussed below), all rhinoceros-bearing areas in India would fall into this category.

Inviability or "Doomed"

A "doomed" rhinoceros is defined as an animal that is considered to have no possibility of contributing to the survival of the species in its current situation because:

- a. it is not part of a population large enough to be viable in genetic and demographic terms, and/or
- b. the animal cannot be protected from habitat destruction or poacher activity with acceptable or available levels of resources.

Gorumara falls into this category. Laokhawa, which has lost all of its rhinos, falls into this category as well. According to Menon's 1996 study, unless immediate steps are taken, with re-introduction plans forming part of the conservation package, these two sanctuaries may well be considered unviable, or doomed, in terms of One-horned Rhinoceros conservation.

With respect to the viability of India's rhino populations within existing refuges, and as support for selecting Kaziranga National Park as the site for the proposed intervention, currently the only two populations of the Greater One-horned Rhinoceros in India which are viable are those of KNP and Orang. However, as Orang has an area of less than 100 km² and there are no current plans to expand the Wildlife Sanctuary, KNP appears to be the best candidate for intervention.

Population fluctuations

This next section is a chronology of rhino population facts and figures; it is essential as background to understanding the impact of poaching on the populations in question. As previously discussed, only KNP and Orang Wildlife Sanctuary are host to populations that could be considered as reasonably viable (notwithstanding that Orang is borderline given the available and potential habitat). As such, I will limit the discussion to those two protected areas. **Figures 2 - 5** present graphic representations of rhinoceros population statistics from 1966-1995, and rhinoceros population growth rates for the same years at both Kaziranga National Park and Orang Wildlife Sanctuary.

Figure 2 Population of rhinoceroses: Kaziranga National Park

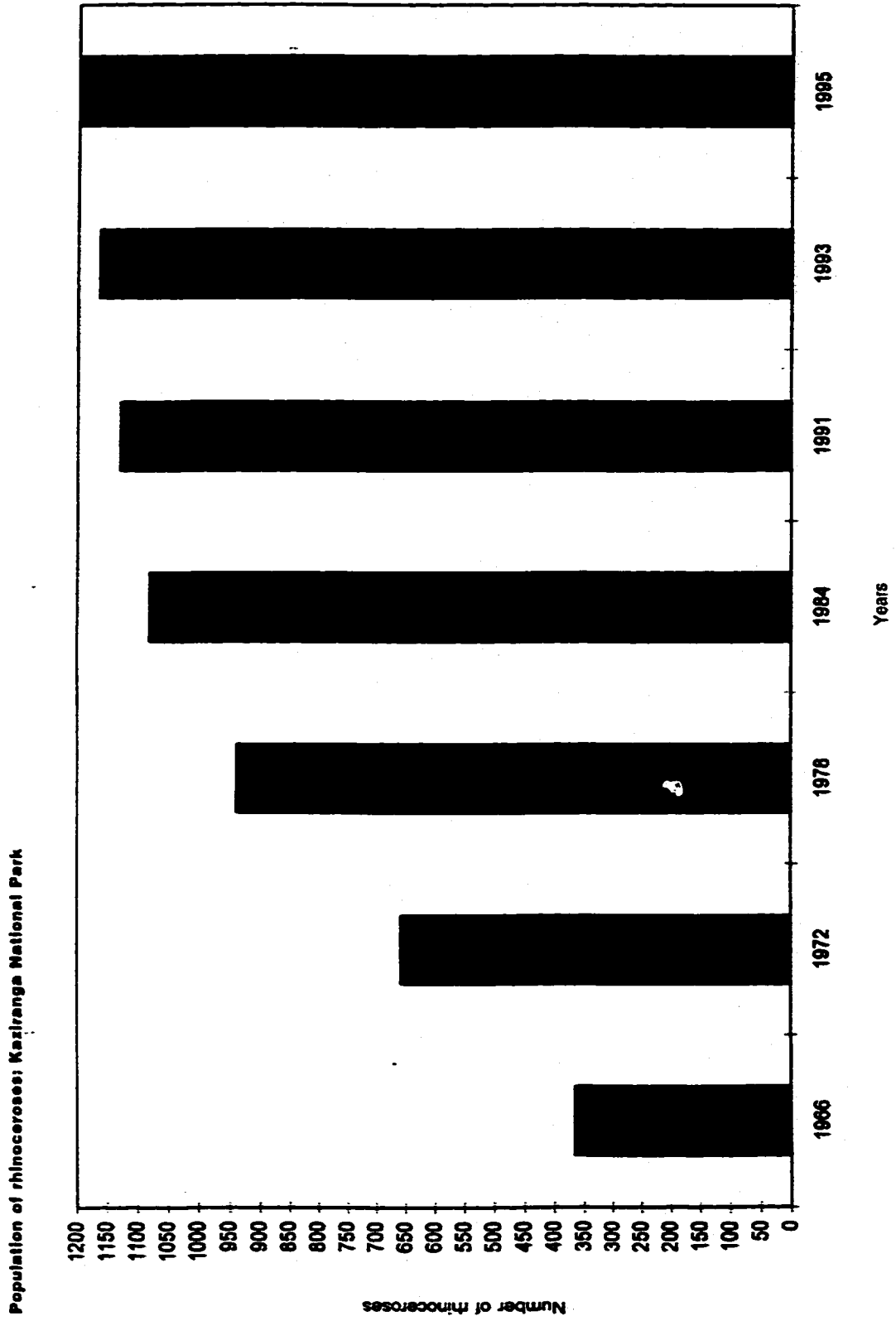


Figure 3 Population of rhinoceroses: Orang Wildlife Sanctuary

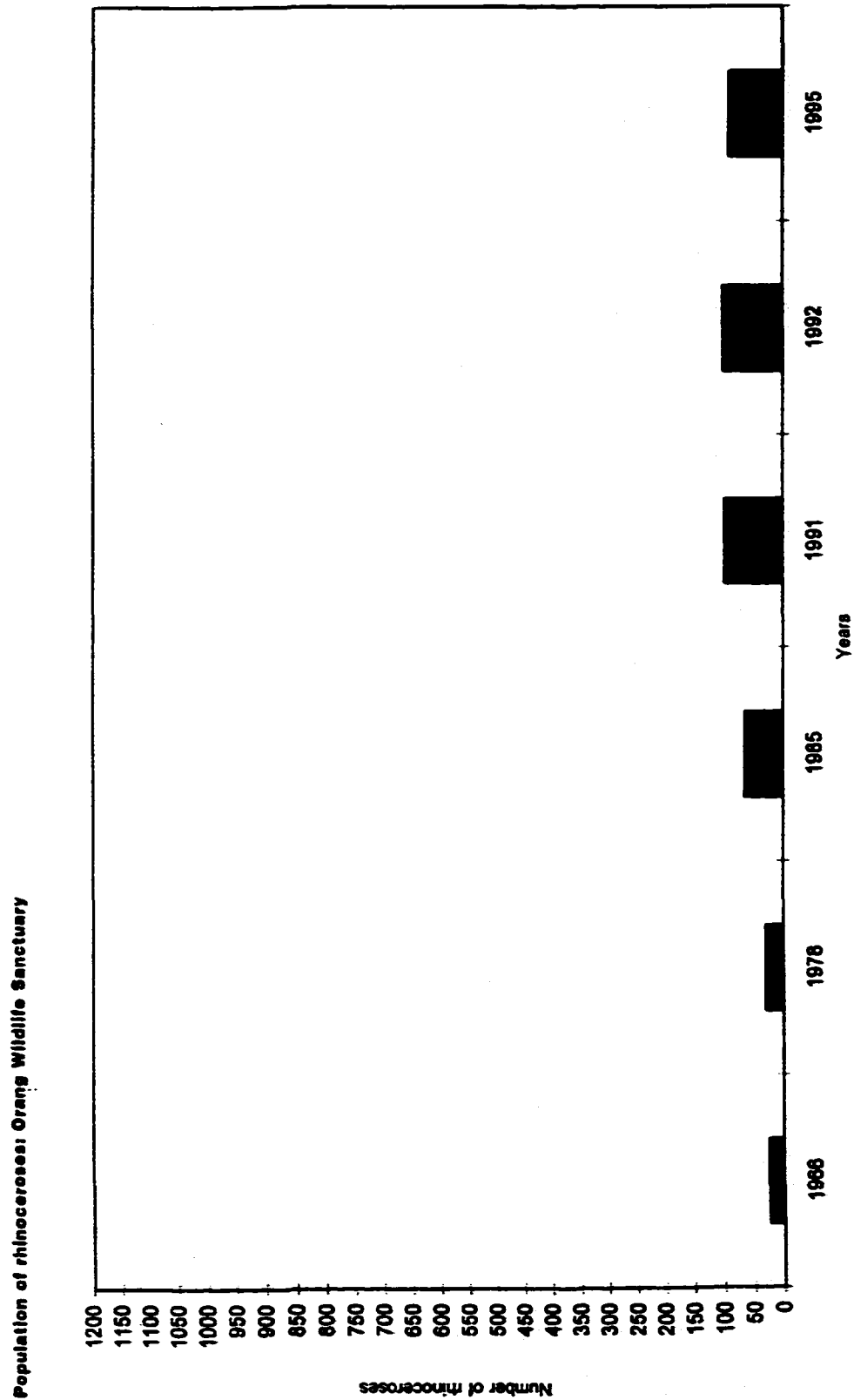


Figure 4 Increase in rhinoceros numbers between successive censuses: Kaziranga National Park

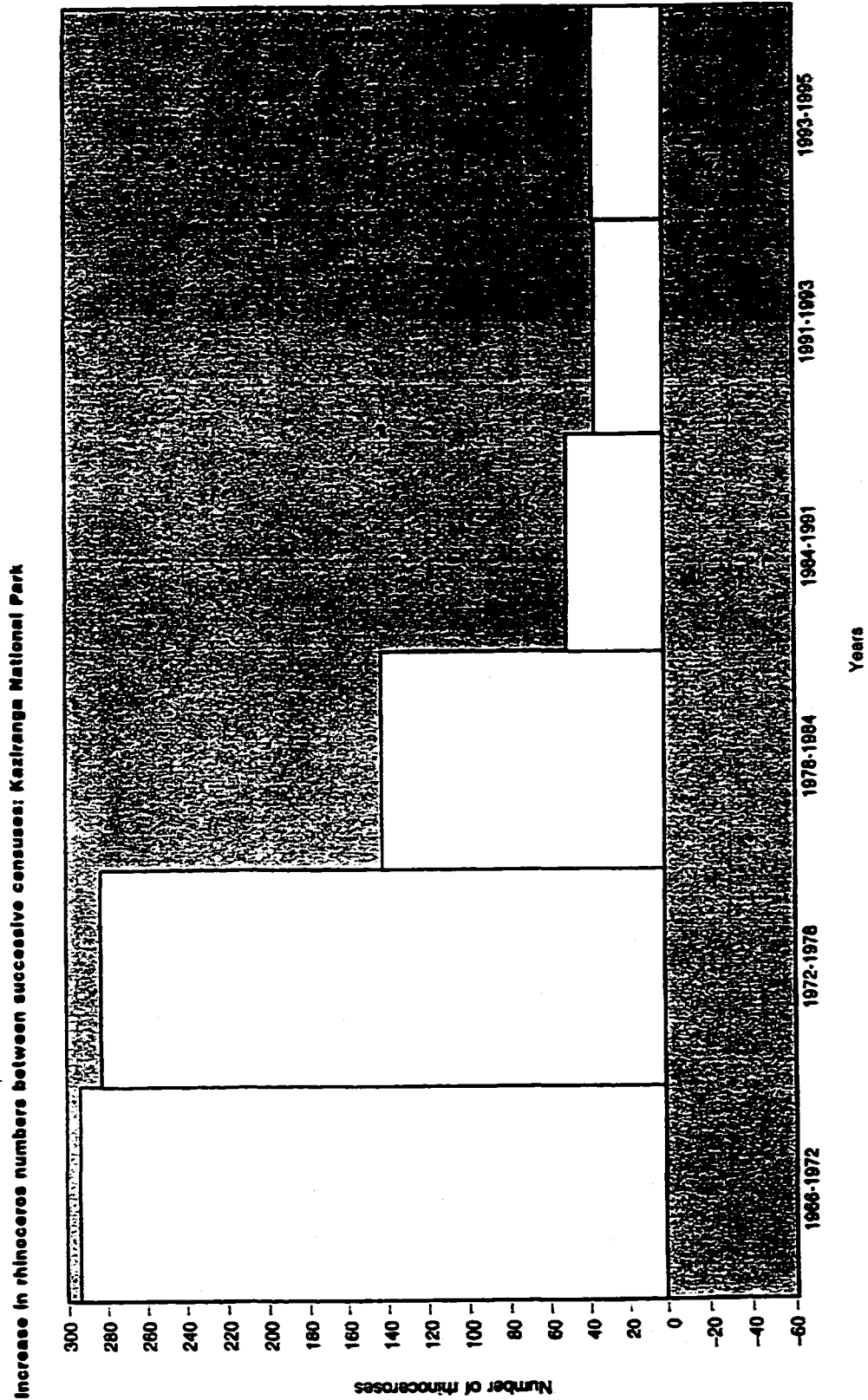


Figure 5 Increase in rhinoceros numbers between successive censuses: Orang Wildlife Sanctuary

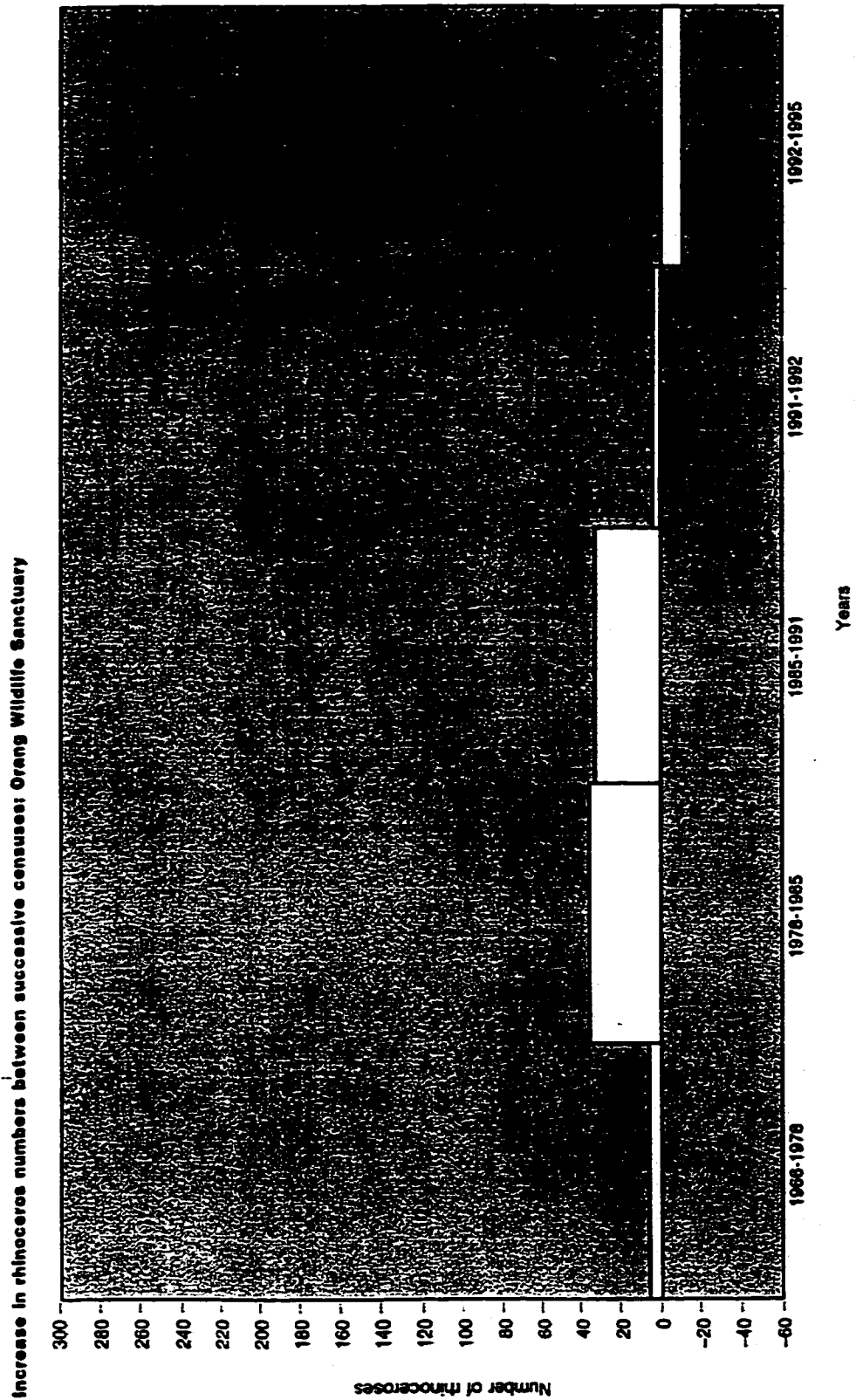


Table 2
Populations of rhinoceroses in India through the years

State/Area	1966	1979	1986	1993	1995
ASSAM					
Kaziranga	400	960	1080	1164	1200-1300
Orang	12	30	65	100	90-100
Manas	15	40	80	25?	12?
Pabitora	6		40	65	68-76
Laokhawa	40	40	5	0	0
Other pockets	52	15	25	60?	20
WEST BENGAL					
Jaldapara	50	40	32	34	35
Gorumara	5			15	18
Other pockets	—	—	—	25	?
UTTAR PRADESH					
Katerniaghat					4
Dudhwa			7	12	13
TOTAL	580	1125	1334	1504	1512

Source: Menon, 1996: 38

The wild population of the One-horned Rhinoceros in India has grown from 580 in 1966, to 1125 in 1979, 1334 in 1986, to roughly 1512 in 1995 (*see Table 2*). (Menon, 1996: 38) Kaziranga has marked the most dramatic increase, from 12 at the turn of the century to 1200 today. (Menon, 1997: pers.com.)

1960s

The 1960s marked the first organized estimates of rhinos at KNP and Orang, with 366 and 12-25 animals, respectively. (Spillet, 1966) Only one census was made at each of these protected areas during the decade.

1970s

KNP was censused twice during the '70s, in 1972 and again in 1978, when 658 and 939 animals, respectively, were counted. During the six-year gaps between 1966-'72 and then to '78, the growth was approximately the same, specifically an increase of 292 and 281, respectively. Twenty-five to 30 rhinos were counted in Orang. (Menon, 1996: 40)

1980s

KNP was only censused once in the 1980s, in 1984, when 1,080 rhinos were counted. However, the increase in number since the 1978 census was considerably smaller than increases

during the two previous inter-census periods. Orang was censused in 1985, and a tally of 65 rhinos were counted marking a doubling of population figures since the previous decade. (Menon, 1996: 41)

1990s

Kaziranga's rhinos have been officially counted twice so far this decade, with figures of 1,129 in 1991 and 1,164 in 1993. Menon estimates the 1995 population at 1,200-1,300 animals. (Menon, 1997: pers.com.) The figures show that the population increase of 49 rhinoceroses in the six-year interim between 1984 and 1991 was at an even lower rate than during the inter-census periods of the 1980s. Therefore, while KNP's rhino population appears to have been growing steadily since earliest counts were taken, growth rates have been on the decline (*see Figures 2 & 4*). Though it is acknowledged that recruitment rates level off as population sizes increase, "this factor alone would not account for such a conspicuous pace of decrease in population growth. Rather, the rate may be explained by the high rate of poaching that has affected the park." (Menon, 1996: 41) Orang's rhino numbers grew from 65 in 1985, to 97 in 1991, and now carries an estimated 90-100 rhinoceroses.

The total number of One-horned Rhinoceroses in India, then, taking into account all of the protected areas, is estimated to be between 1,407-1,523; the state of Assam being home to the vast majority, or about 1,400 rhinos. Of the 1,400, at least 1,300 reside in KNP and Orang combined (the two most viable populations), and at least 1,200 of those roam free within Kaziranga. "Such a high concentration of such a threatened species in this one State, currently suffering tremendous law and order problems, already places the species' survival in jeopardy, without the added threat of poaching." (Menon, 1996: 41) Although it appears that both KNP and Orang have been increasing in numbers (*see Figures 2 & 3*), considering numbers alone without juxtaposing them against growth rates is deceptive. **Figures 4 & 5** depict drastically declining growth rates at both KNP and Orang; these stark figures are attributed largely to poaching. (Menon, 1997: pers.com.)

Chapter 8 — Poaching

Rhinoceros hunting and trading in India was officially banned in 1912; any subsequent killing of rhinos, therefore, was illegal. (Wildlife Act, 1972) At the time of the official ban, hunting and habitat loss had nearly wiped out the entire rhino population in Kaziranga, leaving as few as a dozen individuals left to stave off extinction. (Menon, 1996) Conservation efforts of the day — a combination of law and order, even if not a change in the people's attitude toward the importance of species diversity and preservation²¹ — were instrumental in effecting the recovery of India's rhino population, until such time as poaching pressures began to take their toll in the 1960s. (Assam Forest Department, 1996)

The 1960s saw the first real wave of poaching hit Assam. The relative abundance of rhinos (due to the aforementioned efforts) and the concomitant relaxation of guard among park staff made rhino poaching a rewarding if not particularly challenging task for the poachers. (Bonafant, 1997: pers.com.) The tide of poaching ebbed in the 1970s, owing largely to depleted rhino populations following the poachers' success in the 1960s. This changed again in the 1980s, with the decade as a whole seeing a resurgence in poaching and innovation in poaching methods with the introduction of poisoning and electrocution. (Menon, 1996) During the period from 1980-'84, 251 rhinos (nearly 25% of the Indian population) were known to have been poached across the country; half of that number were poached at KNP alone. From 1985-'89 a further 232 rhinos were taken illegally, resulting in a total of 483 individuals poached during the 1980s (*see Table 3*). This was particularly alarming given that there were fewer than 2,000 wild One-horned Rhinoceroses left in the world. (Menon, 1996)

Poaching has accelerated this decade notwithstanding increased conservation efforts. In the four years from 1990 through 1993, 209 rhinos were known to have been poached in India,

²¹I make this claim in reference to prefatory comments to the 1991 Amendment to the Indian Wildlife (Protection) Act of 1972. Raj Panjwani, the Advocate of High Court of Delhi and Counsel for World Wild Fund for Nature-India, commented that the 1912 Act codified laws which were aimed at protecting animals that were normally killed for food to a great extent by large rural populations. Big game animals such as the elephant, lion, tiger, leopard, bear, and crocodile, which were mainly seen as trophy animals and hunted by the affluent, were exempted from the 1912 ban as they were considered to be of no use either to people or to the environment.

amounting roughly to 14% of the remaining population. Excepting 1983, when India lost 95 rhinoceroses, the country had never lost more than 60 rhinos in one year. However, 1992 and 1993 each recorded losses of 66 rhinos. During that same four-year period KNP lost 147 rhinos, or 12.6% of the park's total population. Most alarming are predictions that if the trend continues KNP will lose more rhinos this decade than in the last (*see Table 3*). (Menon, 1996) The Assam Forest Department attributes the heightening intensity of poaching to the value of the horn on the black market following the ban on trade.

The last sale of Rhino horn in Assam took place during 1978 and during 1980 tenders were called but the sale was stopped. This was the beginning of measured intensity of poaching in Kaziranga National Park as well as other Rhino bearing areas. (Assam Forest Department, 1996: 11)

Table 3
Number of known rhinoceroses poached in India, from 1980 to 1993

Protected Area	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	Total
Kaziranga	11	24	25	37	28	44	45	23	24	44	35	23	49	40	452
Orang	2	2	6	10	7	8	3	1	4	3	0	1	1	—	48
Manas	3	2	1	3	4	1	2	7	1	6	3	6	11	21	71
Pabitora	0	0	0	0	4	2	0	2	3	4	2	1	3	4	25
Laokhawa	1	5	9	41	5	2	1	0	0	0	3	1	0	0	68
Pockets in Assam	3	2	4	2	0	0	0	0	0	0	0	0	0	0	11
Jaldapara	—	1	3	1	2	2	0	0	0	0	0	1	1	1	12
Gorumara	—	1	0	1	1	0	0	0	0	0	1	0	1	0	5
Total Poaching	20	37	48	95	51	59	51	33	32	57	44	33	66	66	692

Source: Menon, 1996: 63

Notwithstanding these poaching statistics, the initial protection measures have been so successful that the One-horned Rhinoceros now survives only in pockets of protected areas, declining to low numbers in non-protected areas (*see Table 2*). This situation is unique to rhinos, as conservation efforts aimed at other Indian megafauna (such as the Tiger or Asian Elephant) in protected areas has proved successful in non-protected areas as well. (Menon, 1996) This has led to terrible fragmentation to both the population and habitat of the One-horned Rhinoceros, and consequently has increased the exposure of isolated populations to the threat of poaching and extinction. (Sharma, 1997: pers.com.; Menon, 1997: pers.com.)

Although rhinoceroses have been pressured by poaching since the inception of their protection (prior to that rhino populations were pressured by hunting), two periods stand out as

being the most significant in terms of total rhinos poached: 1982-1986, and 1989-1993 (*see Table 3*). (Assam Forest Department, 1996). These two periods can be best understood in terms of waves “catalyzed by local conditions and, conversely, quelled to some extent by retaliatory enforcement.” (Menon, 1996: 62) These two waves are distinct from each other and are not part of a single event marked by an interim lull. The waves, however, do represent a number of similar factors, including: periods of civil unrest leading to breakdowns of both law and order and protection efforts at reserves; the demands of the Traditional Chinese Medicine market for rhino horn; and, local factors that lend themselves to the constant opportunistic presence of poachers. (Menon, 1996)

Poacher's profile

As mentioned above, civil unrest is one of the ties that binds politics to poaching in Assam. The operations of the United Liberation Front of Assam (ULFA), which began in the mid-'80s, and the Bodoland dispute, which took centre stage between 1987 and 1989 (*see Box 2*), coincide with the two aforementioned poaching peaks. Though it is reasonable to attribute a substantial amount of the poaching to these two insurgent groups, there is ample evidence that it is the opportunistic poacher who profited from the breakdown in law and order that followed on the heels of the uprisings (to a greater degree than the rebels themselves). (Menon, 1996) In fact, the identity of the rhinoceros poachers and traders has fueled considerable debate.

Box 2 Civil uprisings in north-east India

AASU — All Assam Students Union was a powerful students' association that rocked the State government in 1983 with a series of demands for reform for Assam. During 1983-84 many of their demonstrations took a violent turn causing a severe break in law and order in certain parts of Assam. The agitation had as its epicentre central Assam.

ULFA — Today an outlawed group considered extremist by the State government, the United Liberation Front of Assam grew essentially out of the AASU agitation and registered as a party in the late 1980s. For nearly a decade ULFA was a powerful influence on State politics, demanding social reforms and change. The movement turned militant after a more ideological start and hence was outlawed. Today, surrendered members of ULFA have formed a separate sect called the SWLFA and both groups continue to exert pressure on the State administration.

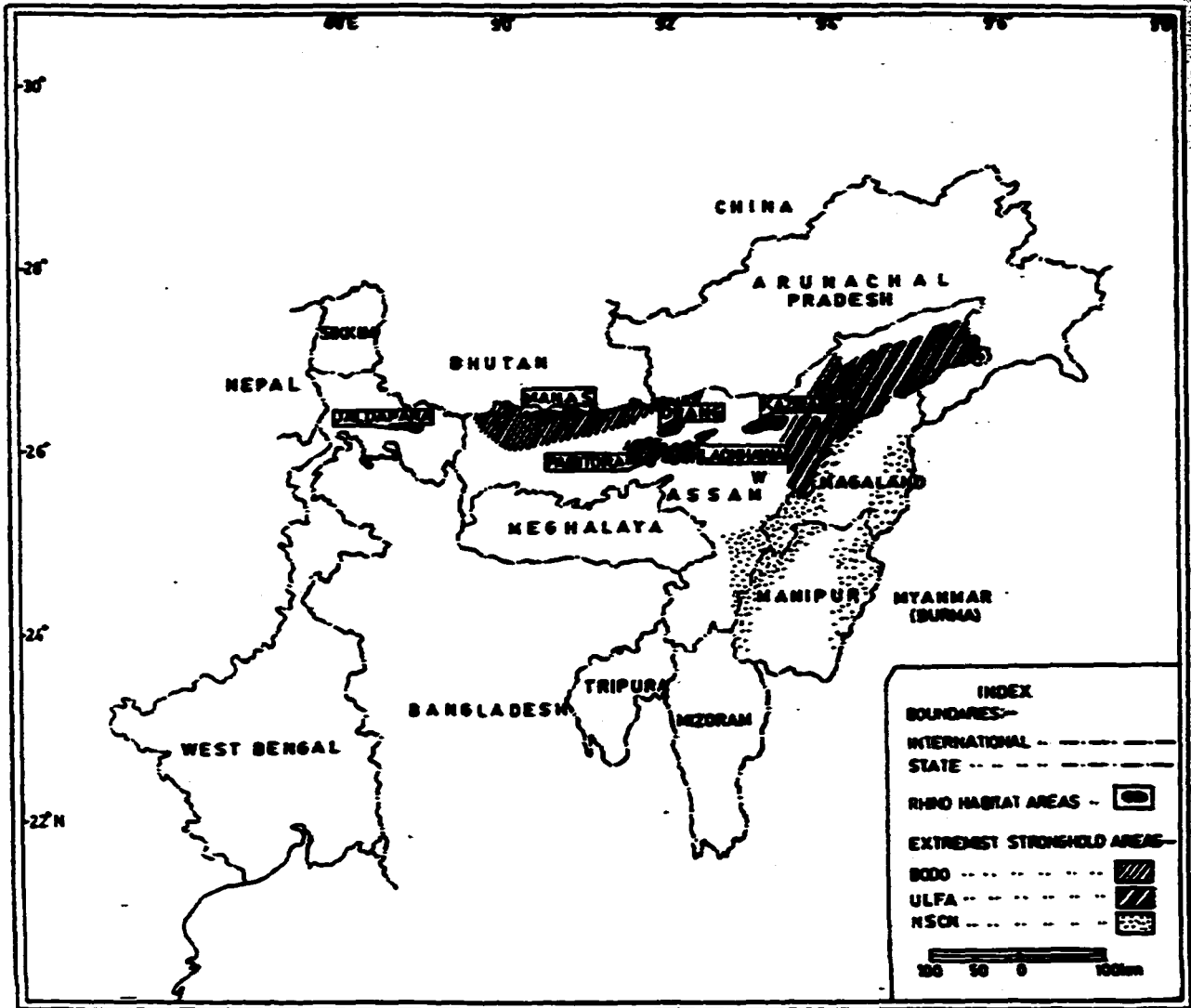
BODO movement — The Bodos are tribals of the lower Assam area based around the town of Kokrajhar. The Bodo movement began in the late 1980s and grew in strength until about the end of that decade. From then on it turned militant and pressed for Bodoland, a separate State, where the Bodos believe they would enjoy rights currently denied them. There are several splinter groups in the movement of which the All Assam Bodo Students Union (ABSU) is the most powerful.

NSCN — The National Students Council of Nagaland is the group fighting for its rights in Nagaland, a neighbouring State of Assam. The Naga movement started in the 1960s and has been a festering sore for the Indian administration ever since. The NSCN have been blamed by Indian authorities for most of the arms running from nearby Myanmar and for subsequent supply through northeastern India.

Source: Menon, 1996: 64

Figure 6

Map to show areas occupied by political rebel groups in India, with reference to rhinoceros-bearing areas in the country



The most prevalent information suggests that it is the Naga tribesmen who are most often associated with poaching in KNP. (Menon, 1996) The Naga are a tribal people chiefly from the State of Nagaland, which is situated directly between Assam and Myanmar (see Figure 6). The Naga are traditional hunters and have ready access to sophisticated arms. This, and their geographical location near Myanmar, a key trade route, facilitates their entry into poaching and their security in the industry as horn couriers. (Sharma, 1997: pers.com.) Menon suggests that the Naga receive more than their share of the blame for poaching, as an analysis of 123 randomly selected official judicial records of rhino-horn poachers and traders reveals that the Naga tribal separatists are not among the most oft apprehended group. Only 5% of the 123 apprehended were Nagas; 4% were Nepalese and Bhutanese; 11% were Mising tribals; 26% Assamese Hindus; 35% Bangladeshis/Muslims; and 19% "others." (Menon, 1996: 65)

Though there is evidence of extremist groups such as the National Students Council of Nagaland (NSCN), the ULFA and the Bodos selling rhino horn to finance their insurgency, (Martin, 1991) it is fair to conclude that poachers are just as often financed by opportunistic traders who take advantage of breakdowns in law and order. (Boro, 1997: pers.com.; Sharma, 1997: pers.com.) The two scenarios are not unrelated, however, as it is the insurgency actions of the rebel groups that lead to the breakdowns in law and order that often create the poaching opportunities for non-rebels.

There is also evidence that local Assamese (i.e.: not belonging to a particular tribe or rebel group) from villages surrounding KNP are involved in poaching, even if as passive participants. (Bonal, 1997: pers.com.) As most poachers come from far-off villages, they need a "base camp" where they can wait for the right time to enter the park, where they can store their arms, and to which they can return after poaching. Equally as important, the villages provide poachers with access to "field men," or locals who have knowledge of patrol routes, locations of anti-poaching camps and watch towers, and rhino *dandis* and latrines. (Boro, 1997: pers.com.) It is too simple a statement to make that the field men are motivated solely by money, though money is the trade currency and certainly one of the predominant motivating forces. Often field men are motivated by

survival and a sense of vengeance; that is, the poachers offer them money they could not otherwise obtain to replenish crops or repair damages to their homes caused by wildlife. There is no official or officially functioning government scheme to compensate villagers for damage caused by migrating park wildlife. (Wright, 1997: pers.com.) For many villagers, the payment offered by poachers is the only hope they have of making it through difficult times. (Das, 1997: pers.com.)

Poaching, typically, is organized by a syndicate of agents or middlemen who recruit a small handful of men who are sufficiently needy to be bought with whatever sum is being offered. (Bonal, 1997: pers.com.) The middlemen offer the two or three or four poachers food and drink, and then give them advance money and whatever arms and ammunition they request. The poaching team, a gang of two to five men armed and prepared for the likelihood of an armed confrontation with enforcement personnel, enters the park, usually in the morning or at dusk. The enforcement personnel are often out-gunned. According to KNP Director B.S. Bonal, "at a poaching encounter on May 27th, 1996, a poacher overheard forest guards radioing the base for more ammunition because they only had five rounds each."

Poaching teams have been known to stay in the park from three to 10 days. (EIA, 1996) There is no pattern as to the time they kill. The shots will be heard by enforcement staff and it is not uncommon for firefights to ensue between forest guards and poachers that often result in fatalities. (Boro, 1997: pers.com.) The main poacher, or shooter, is not paid according to horn weight or size, and often not even according to the number of horns obtained, but according to the operations conducted. (Menon, 1996) The main poacher is usually a sharpshooter hired strictly to kill; the rest of the poaching team is responsible for all else, but particularly for hacking the horn from the rhino's face. According to Martin and Vigne's 1994 study, the main shooter will be paid approximately \$320-\$640 (US), and his teammates a maximum of about \$300 (US) each. (Menon, 1996: 67) For the sake of comparison, a forest guard earns about \$70 (US) a month. (Sharma, 1997: pers.com.) A poacher will make roughly 140 times (if he earns \$300) for one horn what a forest guard will earn in the same evening for undertaking work with the same inherent risks.

The following is an unpublished statement made by the Assam Forest Department in 1996 regarding poaching trends:

The trend of poaching has taken a dramatic change from pit poaching to electrocution. The use of Carbine and Silencer by the poachers has increased problem to the untrained staff. The reason for increased poaching are manifold. The prime reason is the high value of the horn in the international market coupled with socio-economic conditions of the villagers (who act as field man) residing around Kaziranga National Park. Moreover, easy availability and free movement of sophisticated arms coupled with militant activities in the North East has aggravated the problem of poachings. The vulnerability of poaching due to its situation is having no natural barrier having villages all along the southern boundary and river Brahmaputra on the north is a constant headache for the Park authorities... Having no natural barrier and having tall grasses, once the poachers sneak into the Park makes it difficult to locate the presence of poachers inside the Park.

Poaching Methods

Three methods of killing a One-horned Rhinoceros have been employed in Kaziranga National Park: shooting, pit traps, and electrocution. Menon's analysis of poaching data from 1980 to 1993 indicate that shooting is by far the preferred method of killing in KNP, used in 59% of all recorded poachings, followed by pit poaching used 39% of the time, and electrocution used in a mere 2% of rhino poachings. (Menon, 1996: 67)

Shooting

Shooting, as stated, is the preferred *modus operandi* of the poacher. Because rhinos have very poor sight, poachers are able to move in reasonably close to the animal to make the kill. Rhino carcasses studied in the field indicate that poachers aim for a single kill-shot, but often will take two or three to finish off the animal. (Mahanta, 1997: pers.com.) The poaching party usually has about 30 minutes before the nearest patrol or camp to have heard the shot reaches the site; every shot fired in KNP will be heard by a patrol, or at a camp, or at one of the range headquarters. (Boro, 1997: pers.com.) Therefore, shooting is usually undertaken only when poachers are acquainted with the range's anti-poaching strategy, and not when a rhino is close to a camp or if a patrol is close at hand. (Menon, 1996) There may be a presumption here of compliance on the part of the enforcement personnel, but according to Range Officers Boro and Sharma, and KNP Director Bonal, it is more a matter of the forest guards not being sufficiently

trained in ambush/counter-ambush and surveillance techniques that leads to poachers successfully evading the enforcement personnel.

Pit poaching

The success of pit poaching, the second most popular poaching method, depends on a number of factors including time (one trip to the park to dig the pit and one to check it), terrain, and chance — unlike shooting, where the poachers go looking for a rhino, the pit is a passive method in the sense that a poacher will only have the fortune of a kill if a rhino falls into the trap (see Figure 7). The primary advantages of pit poaching are twofold:

... not only [is it] difficult to detect before the event (although less so than electrocution traps), but even afterwards: patrol parties have to cover wide expanses of reserve territory, without any audible signal to alert and guide them to the poaching place, as with a shooting. Only rarely are pits discovered before a rhinoceros falls in (although in 1955 as many as six such pits were discovered in Kaziranga National Park). (Menon, 1996: 70)

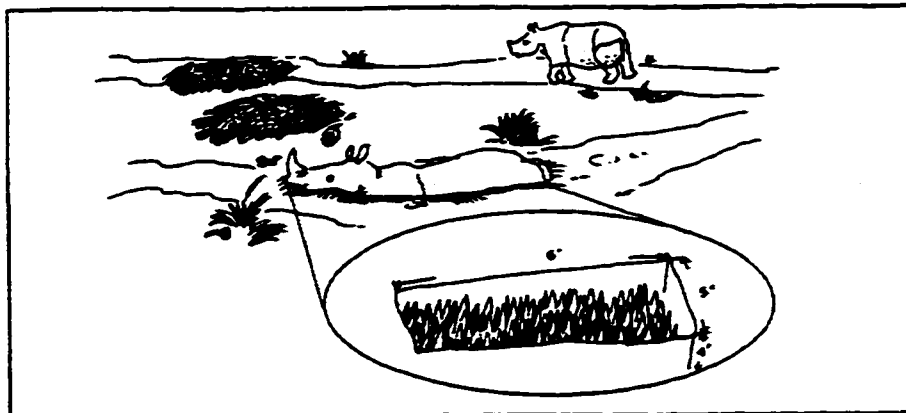
It should also be noted that it is almost impossible to patrol the rhino *dandis* on elephant back because of the grave risk of having the elephants fall into the same camouflaged pits. (Sharma, 1997: pers.com)

The shape and size of the pit, usually dug by a team of three to four men, are designed so that the fallen rhino has little or no room to manoeuvre and the head is slightly above the pit. A pit is usually dug on a known rhino path, or *dandi*, or near watering holes or latrines. Some pits are lined with sharpened bamboo stakes on which the rhino will be impaled and eventually die. Other pits are left unadorned. If the rhino is unfortunate enough not to have broken its neck in the fall, the horn may be hacked from its face while the animal is trapped and defenceless, but still alive. Pit poaching, finally, is rarely employed by poachers with access to guns. (Boro, 1997: pers.com.)

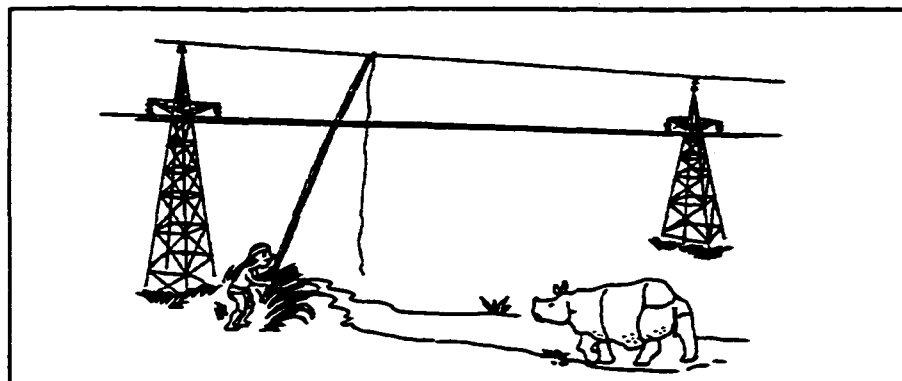
Ironically, pit trapping was originally used by conservationists as a means of capturing rhinos alive for observation. Those pits would have been larger and most assuredly not lined with stakes. Similar to early pit traps, today's poaching pits are camouflaged with twigs and branches and dry leaves. (Patar, 1980)

Figures 7 & 8 Poaching methods: Pit poaching and Electrocuting

Illustration to show a pit filled with sharpened bamboo stakes and a rhinoceros trapped in such a pit



A length of wire is connected to a power line and suspended above a dandi in the hope of electrocuting a rhinoceros



Electrocution

Wherever high tension power lines of at least 11,000 volts pass through or near a park, killing by electrocution is available to poachers. This method is advantageous over both shooting and pit poaching in that it is extremely difficult to detect in advance of its use, and it does not alert enforcement personnel to the poachers' presence in the way that shooting can. To date this method has only been used at Pabitora and Kaziranga, the former having two power lines of 33,000 and 11,000 volts on the northern side of the sanctuary, and KNP having an 11,000 volt line running as far as 25 km across the southwestern portion of the park. (Menon, 1996: 69)

The poacher connects a length of wire to a long bamboo pole and hooks it onto the power line. The bamboo pole is withdrawn and the wire is left dangling and alive in the middle of a rhino *dandi*. The wire is typically hung at the level of a rhino's chest (see Figure 8). Though it is intended to electrocute rhinos, it is indiscriminate in that it will kill anything in its path, including enforcement personnel. This method was first used in Pabitora in September 1989, and in KNP in November 1989. During that year six rhinoceroses were electrocuted in the two parks. Excepting the September 1989 incident at Pabitora, in no case over the following five years, during which five more rhinoceroses were electrocuted, were enforcement personnel able to find the rhinos or poachers before the poachers escaped with the horns. (Menon, 1996: 70)

Timing and other factors

Although poachers traditionally prefer the nights of a full moon, poaching occurs throughout the month, day and night, regardless of the season. (Sharma, 1997: pers.com.) Perhaps the single greatest factor is opportunism, which takes into account myriad factors, including (without limitation): weather and lighting conditions, surveillance levels, and locations of rhinoceroses. (Sharma, 1997: pers.com.) These factors, coupled with KNP's biological, ecological and physical features (see Table 4), make KNP a prime target for rhino poachers.

Table 4
Salient features of KNP and its rhinos, and their relevance to poaching

Biological/ecological/physical feature	Relevance to poaching/anti-poaching
<ol style="list-style-type: none"> 1. Open-country inhabitant 2. To a large extent a grazer 3. Comparatively a social species 4. In suitable habitat, can reach high population densities 5. Very small individual home range 6. Floods cause local migrations 7. Prefers to frequent shallow water/wallows 8. Defecates at marked dung heaps 9. Moves in fixed paths (called <i>dandis</i>) 10. Park bound on North/South by Brahmaputra River/National Highway 37 	<ol style="list-style-type: none"> 1. Easy visibility of animal 2. Dependent on grass, favoured areas known 3. In cases of breakdown of law and order, mass killings are easy 4. Same as above 5. Easy to track and find individuals 6. Often takes rhinos out of protected areas, thus easier to poach 7. Favoured areas known to poachers 8. Known spot for poaching, particularly pit poaching/electrocution 9. Same as above 10. Easy access/difficult to patrol

Source: Menon, 1996: 6

Chapter 9 — Living/working conditions for enforcement personnel

The protection of Kaziranga National Park includes four ranges and a number of proposed extensions, increasing the area from 430 km² to almost 1,000 km². The total workforce at Kaziranga is 435 people with an additional 66 home guards and 87 casual labourers (*see Table 5*). (Assam Forest Department, 1996) The Park Director and Divisional Forest Officer supervise four range officers. Enforcement personnel and staff must also tour the neighbouring villages, giving them a working area of around 1,800 to 2,000 km². (Bonai, 1997: pers.com; EIA, 1996.)

Forest guards live in isolated conditions around the park in stilted forest camps. There are usually five or six men per camp; however, when short-staffed, there may be as few as three. (Sharma, 1997: pers.com.) The living conditions during the monsoon are insufferable. The cots are stilted to avoid the floodwaters, but it is to little effect as the rains drench everything from above that has not already been soaked from beneath. The men survive on rations of rice which they must provide themselves out of their \$70 (US) monthly wage. (Sharma, 1997: pers.com.) According to an Environmental Investigation Agency report, between February and April 1996 the forest guards were unpaid. In July 1996, the men's salaries had been delayed by three weeks. This is not uncommon. (EIA, 1996: 27) Their \$70 salary must be spent frugally as it is also used to support their families and it is the only "regular" source of income they will have. Some of the guards' wives and in-laws, however, use the Forest Department salaries to set up small businesses to augment the family income. (Das, 1997: pers.com.)

Only 50 of the 115 camps have water filters (about \$20 (US) each and last 5-6 years). (EIA, 1996: 27; Assam Forest Department, 1996: 10) On numerous occasions I witnessed forest staff cooking and washing dishes with untreated flood water drawn directly from beneath their camps. The staff suffer serious stomach and intestinal illnesses. They have no access to preventative medicine and are prone to malaria attacks. (Bonai, 1997: pers.com.) One guard and one casual labourer were both suffering the onset of malaria during my visit, but had to continue working nonetheless. I spent one afternoon delivering elephant rations by riverboat to various camps. Of the four camps I visited, only one had more than three residents. In this situation it

becomes very difficult for any of the men to take leave, which is supposed to amount to a few days a month, to visit family. I met a number of men who had not been able to take leave or visit their families for as many as three months. I was told that some of the men had not seen their families for six months.

Night patrol is made nearly impossible at times because the men have no batteries for their torches. On one patrol the Mag-lite I brought with me was the only functioning light. The total battery cost/month for all the camps is about \$350. (EIA, 1996: 27)

The men with whom I patrolled had no shoes or boots and wore only *chappals*, rubber flip-flop sandals, or went barefoot while patrolling the leech and snake infested marshes.

Notwithstanding that I was properly outfitted, I would leave the marshes after every patrol carrying a few leeches on my lower body; my experience with leeches and stinging and biting insects was insignificant and negligible compared to that of the forest staff. The department-issued boots they are provided cost \$5.70/pair and rot within three months. (EIA, 1996: 27) Their uniforms (\$21 US) are supposed to be replaced annually, but KNP only has sufficient funds to replace them every three or four years. (EIA, 1996: 27) The staff, therefore, must provide their own uniforms. During the annual summer monsoon season their clothing is perpetually wet. I observed that they had cut their pants off above the knee to make shorts for patrolling the marshes, and their shirts were threadbare and torn. Consequently, they had no protection from protruding branches and thorned vegetation, leeches, mosquitoes or any other stinging or biting insects. The department is unable to provide them with winter coats (\$31 US each) or raingear for the summer (\$20 US each). (EIA, 1996: 27)

The Environmental Investigation Agency had donated a sum of money sufficient to provide all park staff with new uniforms and insect repellent. For political reasons that were never fully explained the donations never made it to the men; rather, the money remains "in trust" and the insect repellent has been pilfered by locals. (Barua, 1997: pers.com.)

KNP has 41 working elephants (including the young). Twenty five of these are used for patrolling, moving supplies to the forest camps, and of these 6-8 take tourists out in the winter

tourist season. (Sharma, 1997: pers.com.) In many areas, for myriad reasons (e.g.: presence of tigers, impassable terrain), elephants are the only means of transportation. They require 10kg of gram flour or rice with husk every day. Resting elephants require half this amount. (EIA, 1996) Unlike wild elephants, these working animals cannot graze all day and need extra nutrition to help them gain strength for the work. (Sharma, 1997: pers.com.) At the time of the Environmental Investigation Agency visit to KNP in July 1996, the working elephants had not been fed for six months and were visibly suffering from malnutrition; three of them were believed to have tuberculosis. The local supplier of feed was already owed over \$17,000 (US) and was unable to carry any further debt. (EIA, 1996: 29)

The following is excerpted from an EIA analysis of KNP's budget:

Kaziranga National Park has been starved of funds for a number of years. The budget, until the 1996/97 allocation, remained relatively unchanged despite spiraling costs and increased poaching in the 1990s.

The Park was eligible for additional funds from the rhino protection scheme paid for by the Central Government. The last payments actually received in the Park were in 1991. It is alleged that almost \$1 mil. (US) from this and other centrally sponsored schemes has been diverted from wildlife protection by the former State Government of Assam to other unrelated areas since 1989. Since the recent elections the Finance Secretary of the previous Government has gone missing. The Minister of Forests for the new State Government sadly admitted that the former administration had diverted these funds.

Shortly before my visit to KNP in June 1997, the US Fish and Wildlife Service had donated to KNP two Suzuki Gypsies (a Gypsy is a 4X4 vehicle, similar to the Suzuki Samurai formerly exported by Japan). I was informed by senior park officials that one of KNP's senior administrative officers commandeered the vehicle for "testing for jungle fitness purposes." This particular bureaucrat lives and works in the city of Gawahati, the Assamese state capital. Evidently, the Gypsy passed the testing period after grueling city street trials and eventually made its way to KNP about a month later.

Signs of capital investment were evident at each of KNP's range headquarters; however, equally evident were the signs of a depleted or non-existent maintenance fund. KNP has six old jeeps but little or no fuel to keep them going, two trucks (only one of which works), and a store of rusted gun parts, wireless and powerless radio sets, battery-less torches, and unserviceable boat and automobile engines and other parts.

Chapter 10 — Anti-poaching/enforcement strategy

The following statement made by the Assam Forest Department in the unpublished internal 1996 KNP Status Report describes the official current anti-poaching strategy and state of conservation enforcement in KNP:

The anti-poaching strategy now being adopted by maintaining 115 Nos. of camps situated all over the Park areas is not at all full proof method. Moreover, constant patrolling on the southern boundary and placing of two stationary vessels on the river Brahmaputra and patrolling on river routes are the main anti-poaching activities of the Park. The Strategy of having number of anti-poaching camps inside the Park and patrolling thereof had resulted initially very good and any counter firing from the camp had proved quite productive as the poachers either used to leave the Park without poaching or without removal of horns after killing of Rhinos. But now-a-days, the poachers are using sophisticated arms and taking full advantage of staff who are not trained for combat fighting. Therefore, the strategy needs changes but due to lack of infrastructures, it is not readily possible to change the present strategy and to move for complete sealing of Northern and Southern Boundaries wherefrom poachers make entry into the Park. It is also not the fact that there were no direct encounter with the poachers and the staff of the Park but this definitely involves risks.

Anti-poaching/enforcement infrastructure

Kaziranga is by and large the best protected One-horned Rhinoceros-bearing area in India, and perhaps in the world. (Menon, 1996) The following is a break down of staffing patterns and arms and communications equipment maintained at KNP.

Table 5
Staffing patterns at KNP

Designation	Total
Range Officer	7
Deputy Ranger	6
Game Keeper	2
Forester I	43
Forester II	19
Head Game Watcher	4
Mahout	34
Game Watcher	56
Forest Guard	204
Boat Man	60
Home Guard	66
Casual Labourer	87
Total	588

Source: Assam Forest Department, 1996: 17

If a shot is heard in the park it is hoped that two or three camps or their respective patrols will be in a position to react and intercept the poachers. Communication between and among camps and headquarters is unreliable given the limited number of functional radio and walkie-talkie

sets (*see Table 6*). If forest guards hear shots in the Park and they have no radio, they must first travel to a camp that is "on-line" to inform headquarters. This makes quick response impossible and increases the risk to staff of poacher ambush. (Boro, 1997: pers.com.)

Table 6
Serviceable arms and communications equipment at KNP

Equipment	Serviceable
Rifle .315 (total number: 179)	170
SBBL shotgun (total number: 33)	23
DBBL shotgun (total number: 27)	24
Revolver (total number: 6)	5
Others (total: 10)	—
Fixed radio transmitter (total number: 9)	9
Mobile radio transmitter (total number: 9)	8
Walkie-talkie (total number: 35)	30

Source: Assam Forest Department, 1996: 17-18

Anti-poaching intelligence/enlisting local people in anti-poaching efforts

It is almost axiomatic that no poaching can occur without at least the passive knowledge (if not active assistance) of villagers living in and around KNP. The religious ethos of India generally plays a large role in the reluctance of most villagers to aid or abet poachers. (Assam Forest Department, 1996) It is only a small segment of the rural population, mostly comprising traditional hunters, who are willing to help poachers. Two other groups are often involved in assisting the poachers: cattle-owners, who have reluctantly taken to hunting carnivores, and farmers — owners of agricultural fields adjacent to the Park — who have a hand in the poaching of herbivores (such as the Rhino) at least in part in response to crop damage. (Assam Forest Department, 1996) Regardless of the villagers' motives, the physical conditions in KNP, and more importantly the Park's anti-poaching efforts, mean that poachers cannot succeed without the assistance or knowledge of villagers surrounding Kaziranga. (Boro, 1997: pers.com.)

According to the Assam Forest Department, there are three reasons why villagers are not forthcoming with poaching intelligence:

1. the general lack of rapport between Park officials/enforcement personnel and villagers;
2. fear of reprisals by the poachers; and,
3. a widespread hostility in rural areas toward protected areas which have severely restricted access to resource rich lands such as KNP for the fulfillment of basic needs,

including: grazing land, firewood and small timber, and other items collected for the villagers' livelihood. (Assam Forest Department, 1996).

These restrictions and the increasing damage to agricultural crops and cattle by KNP wildlife are the principal causes for the resentment harboured by the villagers toward the Park and park officials. The poachers play on these factors and manipulate the villagers into siding with them. (Boro, 1997: pers.com.)

KNP has not taken any decisive steps toward remedying this situation with respect to formalizing an internal or external intelligence network with either Park authorities or neighbouring villages. (Bonal, 1997: pers.com.) Notwithstanding these factors, there are some local villagers who are often engaged on a *quid pro quo* basis, exchanging information regarding poacher movements through villages, illegal trade of animal parts and weapons, etc., for money or crop seeds or assistance with household, village and infrastructure repairs (e.g.: bridges, culverts). (Boro, 1997: pers.com.) This exchange is not consistently practiced by all the Range Officers, as some feel that none of the villagers can be trusted and that time and money spent on villagers is time and money lost to protecting Kaziranga. (Anon., 1997: pers.com.) It should be noted that it is difficult to generalize as to how divided the KNP camp is over the issue of involving villagers as informants, as the men in each of the camps I visited in both the central and western ranges were resolutely deferential to the opinions of their respective Range Officers.

Despite this fundamental difference in opinion, on the basis of information passed to the Range Officers from village informants, a number of successful raids have been conducted outside the Park (and within the Park, as well). The following is a first-hand account of a successful raid led by Baguri Range-Range Officer Pankaj Sharma.

If anything can be called a lightning raid it was this. It unfolded as follows:

July 2nd, 1997:

6:40 a.m. — 1st rhino was killed
afternoon — carcass was detected

July 3rd, 1997:

Information and planning raid strategy
co-ordination between police and forest enforcement personnel

July 4th, 1997:

1:30 a.m. — raid is successfully completed

3:30 a.m. — back to police station

Within two days the entire operation was planned and executed.

This is the first ever case in the history of Kaziranga of a successful raid where everything was seized, including the poachers, their arms and ammunition, and the horns... This is most surprising... as a matter of fact, poachers do not keep horns for a period longer than this... the horns would have certainly been sold off the next day to the next link in the chain of rhino horn trade.

Men involved:

Responsible actors: Forest dept. personnel (with assistance of Assam Forest Protection Force).

Range Officer:	Pankaj Sharma
Attached Range Officer:	Ranjit Kumar Dutta
Forester:	Jagannath Boruguhain
Home Guard:	Nilakanto Bordoloi
Constable:	Triful Gogoi
Constable:	Jospen Mosahari

Details:

The rhinos were killed in the Kukrakata R.F. (Reserved Forest), just outside the Kaziranga National Park on July 2nd (as mentioned earlier).

On the 3rd of July — in the morning, Pankaj Sharma received information that the poachers were in Timering Village in the Karbi Anglong hills, some 20 odd kms from Sharma's range office in Baguri.

The police were informed in the evening and preparations for the raid began.

On the 4th of July — early morning, 12:05 a.m., the raid party set out; they traveled 12 kms by vehicle and the rest of the way (4-6 kms) had to be walked in pitch darkness and heavy rain.

A stream had to be crossed on the way to the village. On the way to the village the water was knee-deep and rising. A couple of hours later when they were returning it was already above waist height.

Around 1:30 a.m. they reached the village and light from a kerosene lamp could be seen in the house that was the hideout of the poachers. Some sounds of people talking was heard, too. The raid party surrounded the house and when they broke in, they found 5 men drinking country liquor... there was one lady watching from another room.

Another 2 men, probably the ones who gave the other 5 shelter were arrested from the neighbouring house.

The following items were recovered during the raid... and the horns, of course.

1. Two .303 rifles loaded with 5 rounds each
2. 14 bullets
3. 2 bags
4. 2 black tarpaulin
5. lemons, medicines, an ax, candle, lighter

The horns still had the rhinos' flesh hanging from them... the stench was horrible

By 3:30 a.m. the raid party was back at the police station.

Initially, the forest chaps had found only one carcass. The poachers led them next morning to the next carcass.

5 rounds had been fired to kill both rhinos: 2 for the 1st one, 3 for the 2nd.

The poachers hack away the flesh and skull to prove the genuine-ness of the rhino horn. The stench is unbearable and could be smelled from quite a distance.

Even Pankaj Sharma said the moment he entered the room with the poachers, the stench was so distinct, that he knew the horns were there.

The horns had not been dried — Even the bristles could be felt, Pankaj Sharma said.

The horn is later boiled and has to be dried before weighed. The horns were rather small 350-400 grams each only. Approx. price is Rs. 3-5 lakhs/kg.²²

The poachers had been drinking when the raid happened.

The 7 people arrested were (most probably):

- 2 Manipuris (probably the shooters);
- 1 Naga tribal; and,
- 4 Karbi tribals from the Karbi Anglong hills (2 of the Karbis were probably providing shelter).

There was good co-operation from the police of the Dwar Baguri Police Outpost.

Points made by Pankaj Sharma

This was a good example of co-operation between police and forest dept. can work effectively... he was all praise for the police chaps.

He was also very sad that 2 irreplaceable rare creatures had been lost and he had been unable to save them.

2nd part is the law:

All laws under which these poachers will be booked areailable! According to police, the poachers will be charged with:

- illegal possession of arms
- possession of stolen arms
- theft of arms
- killing of Schedule I animal (Wildlife Act)

P. Sharma — was quite disappointed that his effort will get wasted because very soon they will all be out.

Also that the law process will take so long. He wanted special courts to be set up so that at least the decisions are fast.

Also wildlife conservation is not the job of only Wildlife Dept. What happens outside the sanctuary is not in their hand and yet is very important in what happens.

This short accounting provides a snapshot of both the rewards and frustrations of the enforcement personnel. Range Officer Sharma's disappointment in the judicial system in particular was voiced by every forest guard I interviewed. Given that their efforts are often in vain — poachers are usually found back in the park, endangering rhinos, endangering forest guards, within days of operations like this one conducted by Sharma (Sharma, 1997: pers.com.) — it is not difficult to understand their demoralization.

²²1 lakh = 100,000 rupees

The following are accounts of encounters with poachers that took place from February 1991 to October 1995. The dates and details are taken directly from official KNP records.

Table 7
Anti-poaching operations at Kaziranga National Park

Date	Details of Raid
February 02, 1991	A rhinoceros was shot by poachers at Dafong area. In the encounter by the patrolling staff the horn was retrieved.
February 17, 1991	A rhinoceros was shot at by poachers at Bherbheri area. In the encounter the horn was recovered and the poachers fled.
March 05, 1991	At Borakata an encounter took place with poachers who had shot a rhinoceros; the horn was recovered.
April 10, 1991	Near Bandarkhal an encounter took place with the poachers, who had fled leaving behind a rhinoceros horn. Subsequently, a raid was conducted and four persons were arrested.
April 22, 1991	Near Sahaduba a rhinoceros was killed. An encounter took place with the patrolling staff and the poachers were cordoned inside the park.
April 23, 1991	An encounter with the same poachers as above took place. Consequently, two Naga poachers were killed. Their bodies were recovered on April 24th and 25th.
April 24, 1991	Two poachers were apprehended in raids conducted at Daogaon.
May 03, 1991	An encounter took place between poachers and the staff of Daldhibari. Consequently, one poacher was killed while one DBBL shotgun and ammunition was recovered. No rhinoceros was killed.
August 17, 1991	Two rounds of gunshot were heard at Maloni area. The staff on patrol were immediately alerted. No rhinoceros was killed. Poachers fled.
August 28, 1991	An encounter of patrolling staff with armed poachers occurred about 8:30 p.m. at Kanchanjuri. Consequently, one poacher succumbed to a fatal injury and another fled with heavy injuries. One DBBL .470 rifle and one DBBL shotgun with ammunition were recovered. No casualty to staff or rhinoceros occurred.
October 28, 1991	An encounter with miscreants near Naste camp resulted in three persons being apprehended while others fled. The apprehended persons were handed over to the police. Subsequently, a rhinoceros carcass was detected with horn missing under Kartika camp.
April 14, 1992	An encounter with the staff took place at Sesonimukh area under western range and two poachers were killed.

May —, 1992	A raid was conducted at Daogaon under Kaziranga Range and three persons, including one telecoms engineer, were arrested and one silencer with .303 rifle recovered as well as 17 live rounds.
June 20, 1992	An encounter with the staff took place at Bagmari area under Kaziranga Range and one poacher was killed and one Italian-made rifle recovered.
August 20, 1992	An encounter with the staff took place at Rowmari <i>nallah</i> under western range and one poacher was killed.
October 19, 1992	A raid was conducted at Dolamara area and arms were recovered from the poachers. During the raid an encounter took place. Consequently, one person (Naga) was killed, one injured, and two persons were arrested.
November 18, 1992	An encounter took place with the staff at Arimora area under Kaziranga Range and one poacher was killed while one rifle of .303 bore was recovered.
December 12, 1992	A raid was conducted at Jyosipur village near Bokakhat and two .303 rifles were recovered and five persons were arrested.
December 21, 1992	An encounter took place at Naste under Kaziranga Range and one poacher was killed.
January 18, 1993	An encounter with the patrolling staff took place at Selsoni under Murkhowa camp (western range) and one poacher was killed.
February 05, 1993	An encounter with the patrolling staff took place in between Sitalmari and Kartika camp under Kaziranga Range and one poacher was killed.
February 23, 1993	A raid was conducted at Borbetagaon near Bokakhat and two persons were arrested including one Naga. One .303 rifle and 14 live bullets were recovered.
March 26, 1993	An encounter with the patrolling staff took place at Tinibeel Tinali under eastern range and one known notorious poacher was killed.
April 24, 1993	A raid was conducted and three poachers were arrested. One .303 rifle, 25 live rounds and Rs. 13,000 (cash) were recovered.
May 08, 1993	An encounter with the patrolling staff took place west of Gotonga under Burapahar Beat. Two .303 rifles (with live rounds), and one Carbine were recovered.
May 30, 1993	A raid was conducted at Bokakhat and three poachers were arrested.
June 22, 1993 -	A raid was conducted at Bengenakhua, Golaghat. Three poachers were arrested. One SBBL shotgun with two live cartridges, three hand made cartridges, seven .303 bullets, and one .315 bullet were recovered.
August 31, 1993	An encounter with patrolling staff took place at the Burapahar Malani area. Consequently, two poachers were killed, and one .470 DBBL shotgun with one live round and one .500 bore bullet were recovered.
October 03, 1993	A raid was conducted at Geleki Karbi Gaon under Kaziranga Range, and three poachers were arrested. One .303 rifle, two Khaja guns, and 11 .303 bullets were recovered.
October 22, 1993	A raid was conducted at Kaziranga and two poachers were arrested. One .303 rifle and silencer, and six live rounds were recovered.
October 27, 1993	A raid was conducted at Teliabari gaon under eastern range and one hand-made pistol was recovered.

December 28, 1993	An encounter took place between poachers and joint patrolling parties from Debeswari, Erasuti and Ahotguri camps in Hatichora Kherom Tapu. Two poachers were killed.
May 20, 1994	A raid was conducted at Bohikhowa village by forest and police personnel. One poacher was arrested.
June 06, 1994	A raid was conducted at Solung under Nagaon District and three poachers were arrested.
July 26, 1994	A raid was conducted at Bokakhaf and one poacher was arrested.
July 30, 1994	A raid was conducted at Bohikhowa Miching Village and one poacher was arrested.
September 03, 1994	The Forest staff with the co-operation of local people of Balijan Amtenga Village apprehended one notorious poacher and subsequently the police arrested six more poachers on the basis of clues provided by the arrested poacher.
October 03, 1994	A raid was carried out in the house of one Sri Putu Das., a Rhino-horn smuggler at Moral gaon. It was a joint effort between forest staff and police. The villagers attacked the raid party and the smuggler and his associates managed to flee after grievously injuring an informer.
October 16, 1994	A raid operation was carried out in Nagaon and six suspected poachers were arrested.
November 13, 1994	An encounter took place between staff and poachers in Malani Hill area under the western range. Consequently, four poachers were found dead. One .315 rifle, one musket and eight live .303 cartridges were recovered. A raid operation was conducted at Jakhalabandha with the help of police personnel; one poacher was arrested.
November 16, 1994	A raid was conducted in Khotiakholi under Bokakhat. Two poachers were arrested and .303 rifle ammunition was recovered.
November 17, 1994	A raid was conducted by forest staff and police in Amguri village under Jakhalabandha. Four poachers were arrested. One .303 rifle with 20 live rounds, and one .315 rifle with seven live rounds were recovered.
November 21, 1994	A raid was conducted jointly by forest staff and police in Balijan Miching gaon and two notorious poachers were arrested along with ammunition.
November 27, 1994	A raid was conducted by forest and police staff at Kandhulimari village under Bodadhat. Sunil Garh of Naojan was arrested and one SLR/magazine and 20 live rounds were recovered.
December 07, 1994	Patrolling staff apprehended 5 poachers between Joke Tapu and Debeswari inside the park.
December 08, 1994	The night patrolling party foiled an attempt to electrocute a rhino behind National Park High School at Kohora and recovered wire hooked to the 33,000 volt high tension line.
December 28, 1994	A raid operation was conducted jointly by the forest and police staff in the Diffaloo Rubber plantation near Diffaloo river. Four pit poachers were apprehended and their digging implements were recovered.
December 29, 1994	A raid was conducted on the house of Ram Bhadur Chubba and he was arrested for the illegal possession of two Khaja guns.
March 30, 1995	A raid was conducted by forest and police staff in Tamulipathar kamargaon and one DBBL gun was recovered from the house of Bhubeneswar Gogoi.
October 25, 1995	An encounter took place between forest staff and poachers near Laudubi Camp and the poachers escaped. One US Carbine and 20 live rounds were recovered.

The number of poachers and others arrested by KNP enforcement personnel in poaching encounters and raids, and the arms and ammunitions recovered from them illustrate the gravity of the poaching problem. According to official sources, during 1992 and 1993 when poaching reached an all-time peak and KNP lost a total of 89 rhinos (a national total of 132 rhinos were poached in those two years) (*see Table 3*), 17 poachers were killed and 125 arrested. However, only 13 of the 89 horns poached were recovered (*see Table 8*).

Table 8
Anti-poaching operations: outcome data

Year	# of poachers killed	# of poachers arrested	# of arms recovered	# ammunition recovered	# horns recovered
1985	2	10	3	11	11
1986	2	43	5	—	9
1987	3	29	3	—	2
1988	3	13	1	7	1
1989	2	18	1	—	11
1990	3	49	11	104	6
1991	4	25	4	7	9
1992	9	58	9	96	9
1993	8	67	19	43	4
1994	12	46	9	60	1
1995	4	3	1	22	2

Source: Assam Forest Department, 1996: 11.

Chapter 11 — Anti-poaching constraints

With no natural barriers to shield the Park's perimeters, keeping a 24-hour a day vigil for intruders is indeed a nearly impossible task. This is exacerbated by a number of factors, including: the perpetual movement of illegal arms and ammunition through areas surrounding the Park; and, the lack of official deterrents to habitual wildlife offenders and to villages that aid and abet poachers (i.e.: the inability of the law to punish offenders and their accomplices adequately). The Assam Forest Department identified a number of constraints on the effectiveness of KNP's anti-poaching strategy and efforts. (Assam Forest Department, 1996) The most prominent are:

- the lack of an intelligence system;
- lack of infrastructure;
- lack of incentives (i.e.: a system for awarding staff and informers for commendable efforts with respect to rhino conservation in KNP);
- lack of trained staff in combat fighting (and lack of training);
- general law and order problems; and,
- non co-operation on the part of villagers. (Menon, 1996: 95)

All of these constraints were echoed by the enforcement personnel. In fact, most of my conversations with KNP forestry personnel evolved into discussions of their (collective) state of mind, and their thoughts on the issues and constraints that KNP must deal with in its anti-poaching struggle. The poaching problem, they believe, requires social and political resolution, not conservation strategy. (Boro, 1997: pers.com.; Sharma, 1997: pers.com.) This hearkens back to Ghandi's words. The forest guards and range officers realize that when they are gone, barring a sea change in India's political tempest, the singular devotion to rhino preservation that they share will disappear and so, too, will the rhino. There will likely always be forest guards, but future generations of forestry personnel are unlikely to persevere as these men do. (Wright, 1997: pers.com.)

Chapter 12 — Conclusion

Given declining growth rates, among other factors, the One-horned Rhinoceros is perhaps more endangered today than ever before. Despite that the species is showing a population increase according to official statistics, the rhino is facing a very real threat throughout its range. (Menon, 1996) As Kaziranga acts as a single reserve for more than half the world's One-horned Rhinoceros population, notwithstanding its comparative success as a reserve, KNP must not be viewed with complacency. Just the opposite is true: because of its success, and because it is home to the only truly viable population of the One-horned Rhinoceros in India, it warrants particular attention with respect to anti-poaching strategy.

Although tremendous efforts have been made at anti-poaching activities, the number of unrecovered horns far exceeds the number of recovered horns (*compare Tables 3 & 8*). Furthermore, it is not the case that poachers are losing interest in KNP. (Wright, 1997: pers.com.) The current anti-poaching strategy is not significantly or sufficiently reducing poaching in Kaziranga, which in fact has one of the most comprehensive anti-poaching strategies for the protection and preservation of the world's remaining One-horned Rhinoceroses. (Menon, 1996) Therefore, measures aimed at curbing poaching, including intelligence gathering, anti-poaching enforcement, and infrastructure support for the enforcement personnel, must be considered to be of the highest priority.

The most important lesson learned here is that anti-poaching strategy must not be reactive. If KNP's conservation enforcement personnel are to be successful, in light of the fact that they are outgunned and outnumbered, future strategies must be designed to avoid violent confrontations between enforcement personnel and poachers; anti-poaching must be proactive. Currently, the strategy of the enforcement personnel, save and except for those too rare instances when they get tips that poachers are in the neighbourhood and planning a sortie, is to seek out poachers and/or poacher activity; the strategy is reactive. (Boro, 1997: pers.com.) In other words, the terms of conservation are dictated by the poachers. This is also evidenced by numerous ambushes on patrols by poaching teams; the poachers seem to have the upper hand in Kaziranga. (Sharma,

1997: pers.com.) As the enforcement staff are not trained in counter-ambush techniques, they are particularly vulnerable to poaching teams comprising traditional hunters and militants. (Bonai, 1997: pers.com.) Not surprisingly, this, in addition to a sense of abandonment and belief that their actions go unnoticed and unappreciated, has led to the disillusionment and demoralization of the enforcement personnel. (Bonai, 1997: pers.com.; Boro, 1997: pers.com.; Das, 1997: pers.com.; Sharma, 1997: pers.com.; Wright, 1997: pers.com.)

In the conservation chain that tenuously binds the rhino and Kaziranga to survival, the weak links are manifold. A corrupt bureaucracy, political turmoil, hapless and haphazard planning, military insurgency, vengeful neighbours, a billion dollar black market in wildlife parts and products, crumbling infrastructure, technological retardation, non-deterrent penalties — all of these are part and parcel of the issues that erode conservation in Kaziranga National Park. In spite of these corrosive elements, however, the anchor to which these links are bound is still fast. That anchor is the dedication of the enforcement personnel. But as the system and reality slowly chip away at the forest guards' morale, the anchor is bound to give. Clearly, if the One-horned Rhinoceros is to survive and if the forest guards are to live to see another day dawn over Kaziranga, any future anti-poaching strategies must address methods to bolster the morale of the enforcement personnel.

A number of proposals have been forwarded to KNP involving military-style or guerilla-warfare training, counter-ambush training and intelligence gathering. (Barua, 1997: pers.com.) These proposals presuppose the unavailability of armed confrontations with poachers. Though they would enhance the level of protection in the Park for both wildlife and personnel, and it is likely that Special Operations training would have a positive effect on the enforcement personnel's confidence level, these proposals are not designed to bolster morale or to preempt poaching. These proposals have not been implemented, mostly due to the dearth of resources available to KNP for the acquisition of arms, ammunition and other requisite infrastructure. (Bonai, 1997: pers.com.; Tanwar, 1997: pers.com.) The key to a successful proposal rests in avoiding heavy capital expenditures or maintenance costs. (Bonai, 1997: pers.com.; Tanwar, 1997: pers.com.)

Anti-poaching strategy, then, must recognize that in light of the current state of conservation infrastructure in Kaziranga, the only offence is a strong defence. Rather than enhancing efforts to find and confront poachers once they are already in the park, the strategy must be designed to make it too great a challenge for the poachers to get inside KNP and to kill the rhinos in the first place. Therefore, the strategy must be a mechanism to preempt poaching, rather than an initiative to apprehend poachers *ex-post facto* or to combat poachers hand-to-hand. Given that KNP's available anti-poaching infrastructure is not growing in sophistication or strength or volume, the objective here must be to avoid confrontations with poachers by maximizing the efficiency of current assets. The most significant of these assets are threefold: the dedication of the enforcement personnel, their intuitive knowledge of and experience in the Park, and KNP itself (i.e.: a combination of factors related to terrain and wildlife). The thin green line must be made thicker and darker.

The intervention proposed in the following section is an attempt to capitalize on these assets by employing the first-hand environmental knowledge and conservation enforcement experience of KNP personnel in the development of a new on-ground anti-poaching strategy.

Part III — Recommendations

This section presents the intervention component of this Master's Degree Project. It details the objectives, methodology and rationale for the intervention, and steps taken toward its implementation. Based on my research with respect to the poaching of the One-horned Rhinoceros in Kaziranga National Park, Assam, India, and given the realities of the Park's socio-political surroundings, its natural environment, the conservation issues it faces, and limitations regarding economics and Park infrastructure, I recommend the implementation of the following project: **An anti-poaching strategy for Kaziranga National Park, Assam, India — *Employing the first-hand environmental knowledge of conservation enforcement personnel to combat poaching of the One-horned Rhinoceros.***

Intervention Introduction

It is important to recall the fundamental difference between the original project, SPECIES, and this MDP. SPECIES was an attempt to treat the cause of poaching through a process of providing local peoples with viable alternatives; this project is designed to address the effects of poaching (as felt by the forest guards and range officers) by intervening with a two-pronged process designed to internationalize the conservation of the One-horned Rhinoceros, and to bolster the morale of KNP's enforcement personnel. Though this recommended project and SPECIES approach the same problem from opposite ends, the outcome should be the same: an effective anti-poaching strategy grounded in satisfying the needs of the most directly-affected stakeholders. Other than the rhinos, of course, no party is more directly affected by poachers and their activities than KNP's forest guards.

The first prong of this intervention is designed to promote collaboration and personnel exchange between India and Canada in the field of wildlife conservation and strategy; the second prong is designed to employ the first-hand environmental knowledge and conservation enforcement experience of national park personnel (from both countries) in the drafting of an on-ground anti-poaching strategy for the One-horned Rhinoceros in Kaziranga National Park.

As a general rule poaching activity is borne of opportunity; that is, the poachers will take a rhino whenever and wherever they find one. However, as discussed in the Findings section and highlighted by the use of pit traps and powerlines, certain factors contribute to a poaching party's opportunistic success with respect to finding the rhinos at a particular location, even if not at a particular time. Additionally, given the annual flooding and migratory corridors throughout KNP, natural features also contribute to a poacher's success. Indeed, this knowledge is not held by the poachers alone; in fact, the enforcement personnel are intimate with this sort of information.

As discussed earlier, the daily duties of the enforcement personnel cause the men to be sequestered in KNP 24 hours a day, 365 days a year (give or take a "week end" here or there). This is significant because the Park becomes their "home." Daily they walk the same beats, and they see and recognize the same animals and land forms. For these reasons, it is fair to say that KNP's enforcement personnel are more familiar with the Park than perhaps any other group of people, and most assuredly more familiar with the Park than are the poachers. (Boro, 1997: pers.com.) In fact, this experiential or first-hand knowledge of the Park's environment could prove to be the most effective weapon the enforcement personnel have in their battle against poaching. It is this knowledge that I am recommending be used as the foundation for future anti-poaching strategy in Kaziranga National Park.

As previously mentioned, based on the unique set of circumstances at play in KNP, with particular attention to pressures stemming from economics, politics, geography, climate, and the ethic and philosophy of the enforcement personnel, it became clear that the solution must first treat the effect of the problem — the forest guards' despair, waning morale, sense of abandonment and politico-legal impotence — before it can combat the cause. Simply put, maintaining a high morale gives the men reason to continue in the face of appalling adversity. In so doing, there are a number of pragmatic qualifying factors that must be considered if this intervention is to address effectively these myriad issues.

The strategy must be:

- contemporaneous: it must be dynamic to evolve naturally with KNP;
- convenient: it must avoid any training that leaves patrols short-handed;
- economical: it should not place a financial burden on KNP;
- empowering: it must involve the conservation enforcement hierarchy from the bottom-up to ensure that all relevant personnel play a role;
- exclusive: it must not require or encourage "outsiders" to the project to enter KNP;
- inclusive: it must not exclude illiterate/uneducated personnel;
- sage: it must solicit the wisdom and knowledge of elderly and/or retired personnel; and,
- secular: it must not encourage more than a modicum of bureaucratic involvement.

In essence, this project will solicit, capture and interpret the enforcement personnel's first-hand knowledge, and later employ that knowledge in the creation of "event" maps (maps that tell a story of poaching-related incidents and ecological features). Ultimately, this information will be manipulated to create strategy maps that will be used in KNP planning with respect to infrastructure development (both within and outside of the Park) and anti-poaching activities. Along the way, however, it is hoped that this will have the effect of boosting the morale of the enforcement personnel by valuing their knowledge and experience. In this way, it is hoped that they will find a sense of ownership and pride in conservation beyond their role as armed guards.

In addition to capturing the first-hand environmental knowledge of KNP's enforcement personnel and using it in anti-poaching strategy, this project recommends one other disparate but complementary activity (described above as the first prong of the intervention): the establishment of a sister-park relationship between KNP and a UNESCO World Heritage Site in Canada. Furthermore, given the experimental nature of this project, I recommend that it be considered a pilot project, the successes and failures of which must be documented for future reference (this will be discussed further below in **Monitoring and feedback**).

Finally, one last note on the origin of the recommended intervention. One early morning after night patrol I asked a senior guard to show me on a map where we had spent the night patrolling. The only map I had with me at the time was the small, hand-rendered map on the KNP tourist-information pamphlet. He used my pen to sketch out our route. I asked him to locate the *beels* where we had first seen rhinos at the beginning of the patrol. I took a sheet of Indian writing paper from a desk in the range office; it was translucent, like onion skin. I marked four points on the onion skin paper to reference it to the tourist map. I asked a different guard to locate where he last encountered poaching activity. I took another sheet of paper. I asked another guard to locate rhino latrines on his beat. I overlaid the base map with the two sheets of onion skin paper. To say the men were enthusiastic would be a gross understatement. Each of the guards had disparate knowledge of their respective beats. Collated, however, the disparate pieces of information formed a snapshot of poaching. It made sense to them and it made sense to me. Being familiar with the organizational and graphic display strengths of Geographic Information Systems technology, it occurred to me that the knowledge held by each individual forest guard and range officer, taken collectively and filtered appropriately, could be used to create a bird's eye view of poaching that potentially could shut the Park off to poachers.

The objectives, methods and rationale for the recommended intervention are discussed below.

Intervention Objectives

1. To raise the morale of KNP's enforcement personnel.

This will be attempted through the fulfillment of two fundamental objectives:

- 1.1 To establish a sister-park relationship between a Canadian World Heritage Site and KNP to facilitate the international collaboration, education, exchange and training of park personnel with particular attention to combating poaching; and,
- 1.2 To employ the first-hand environmental knowledge and conservation enforcement experience of KNP personnel in the development of an on-ground anti-poaching strategy for KNP.

2. To develop an on-ground anti-poaching strategy for the One-horned Rhinoceros in Kaziranga National Park.

This will be accomplished through the fulfillment of two fundamental objectives:

- 2.1 To capture and map the first-hand environmental knowledge of KNP's enforcement personnel; and,
- 2.2 To use the information collected in 2.1 in concert with the conservation enforcement experience of personnel from both KNP and a Canadian World Heritage Site in the development of an on-ground anti-poaching strategy for KNP.

Intervention Methods

Objective 1:

As the United Nations Educational, Scientific and Cultural Organization (UNESCO) has expressed interest in this project (written confirmation pending), and both Canada and India are States Parties to the UNESCO Constitution, provided that Canadian, Indian, and UNESCO authorities are *ad idem*, UNESCO could formalize a sister-park programme between KNP and an appropriate World Heritage Site in Canada. (Ishwaran, 1998: pers.com.) Essentially, UNESCO could act as a conduit for collaborative conservation between East and West. Waterton National Park (WNP) in south-western Alberta, Canada, is a prime candidate for such a programme given its existing relationship as the "International Peace Park" with Glacier National Park in the United States. (Ishwaran, 1998: pers.com.) Though this has been discussed unofficially with WNP staff, no formal negotiations have taken place.

It is my hope that an international transfer or exchange programme will be established to enable KNP enforcement personnel to work with, teach and learn from other conservation enforcement personnel from Canada, with the expectation that conservation personnel from both countries will develop new skills, new bonds, and an improved attitude. Additionally, as there is evidence of corruption within the Indian governmental bureaucracy, (EIA, 1996) the twinning programme may help to establish a sort of "watchdog" presence as a deterrent to the diversion of future funds and donations from KNP. (Boro, 1997: pers.com.) The Indo-Canadian twinning programme should be seen as part and parcel of the second objective, as it is through the process of mapping the first-hand environmental knowledge of KNP enforcement personnel that the Canadian personnel will learn about Kaziranga's manifold issues and conservation problems. The twinning programme, ultimately, is aimed at diffusing some of the corruption that has plagued

KNP in the past, (EIA, 1996) as well as combating poaching of the One-horned Rhinoceros and raising the morale of KNP enforcement personnel.

Objective 2:

Iconographic mapping will be used to capture and express graphically the first-hand environmental knowledge of the forest guards. A small team comprising researchers and Canadian conservation personnel will work with KNP staff to describe and map incidents related to poaching and other matters affecting the security and ecological integrity of KNP. Currently there has been no documented effort to record the intimate knowledge of KNP held by its enforcement personnel. As many of the forest guards have been living and working in KNP for years, they possess a wealth of first-hand knowledge of species interaction, ecology, and park evolution. The anecdotal, iconographic mapping provides an opportunity to preserve their knowledge (as expressed in the oral tradition) for use in present and future decision making. Equally as important, this process provides the men with a sense of park ownership and participation beyond their primary role as wildlife bodyguards. It provides these men the opportunity to leave a legacy of more than just their sacrifice and service time.

I have secured a promise for cooperation and participation in this project from the Arctic Institute of North America (AINA) and the Mistakis Institute of the Rockies (written confirmation pending). Under the direction of the Arctic Institute, employing methodologies proven in various projects mapping traditional (Aboriginal Canadian) land use and occupation, a series of GIS maps would be created comprising both scientific data collected in KNP and the enforcement personnel's first-hand environmental knowledge. These GIS maps would be produced through the sister-park, or twinning programme, as Canadian personnel, AINA and the Mistakis Institute possess the appropriate equipment and resources to assist the KNP staff. Ultimately, the output maps from this phase of the project will be presented to the Assam Forestry Department to be used in concert with the conservation enforcement experience of all parties involved to draft an on-ground anti-poaching strategy for KNP. Map outputs can also be used as a tool for infrastructure development and planning. The following is a detailed description of the mapping process.

Mapping the first-hand environmental knowledge of KNP's enforcement personnel

Overview

Box 3

First-hand environmental knowledge mapping study

Baseline mapping — The mapping of objective features or attributes, including (without limitation): place names, *beels*, rivers, roads, ranges, Park boundaries, watch towers, patrol camps, other built structures (e.g.: range offices and Park gates), villages (where appropriate), power lines.

Overlay mapping — The mapping of individual data sets of subjective features or attributes on transparent overlay maps, including (without limitation): rhino *dandis*, rhino latrines, areas of rhino activity; areas of other wildlife activity, wildlife corridors, wildlife escape routes during flooding; flood patterns; locations of poaching activity (both within/out the Park including, for example: points of entry to the Park, pits, electrocution sites, rhino carcass discoveries, poacher ambush sites, patrol ambush sites, incident locations); patrol routes; encounters with villagers; personal experiences within/out the Park.

Event patterns — Once the overlays are assembled it is possible to identify patterns of events and relationships in areas of heavy activity.

Planning strategy I — When the patterns of events and relationships are understood, it is possible at a glance to begin to formulate general strategies with respect to anti-poaching and infrastructure maintenance and development.

Planning strategy II — Once the overlays are digitized and entered into a GIS database, computer queries can be made to finalize detailed strategies with respect to anti-poaching activities and infrastructure maintenance and development.

Source: AINA, 1994; Brener, 1998

Taken together, the five levels described in **Box 3** provide multiple reasons for undertaking the first-hand environmental knowledge mapping study. Each of the levels of analysis will provide immediately usable data; however, the potential of the system will not be fully realized until the final stage when comparisons and queries can be made to reveal patterns of events and relationships that would otherwise be too complex to conceive of without the aid of a GIS database and graphic output.

Administration

The first step, after approvals are granted and funding is secured and the project is ready to begin,²³ is to establish the project's steering committee, or Strategy Advisory Committee (SAC).

²³As mentioned earlier, both AINA and the Mistakis Institute of the Rockies have committed themselves to assisting this project, including providing grant application and funding support. Additionally, as UNESCO is currently negotiating with the Author the terms and conditions of implementing these recommendations, if the project is approved KNP might have access to UNESCO's \$50,000 (US) conservation fund. The possibility of further funding is also being discussed with ASSAM OIL, of Assam, India. (The company's logo is the One-horned Rhinoceros).

The SAC shall:

- make contact with and determine the roles of enforcement personnel (seniority should be respected and senior enforcement personnel (i.e.: experience/rank) should be solicited first);
- determine the terms and conditions of work; and,
- hold meetings to review work in progress and adapt the methodology as needed.

Agents from the Assam Forest Department, KNP and the Canadian team will have to determine the ideal size and composition of the SAC. (AINA, 1994)

The SAC will likely need to form a Technical Advisory Committee (TAC) to advise on such matters as map and data storage, equipment usage, etc. The size and composition of the TAC will depend on the technology being employed in the mapping study. With the SAC and TAC in place, the first-hand environmental knowledge mapping study can begin. (AINA, 1994)

Collecting knowledge

The enforcement personnel's first-hand environmental knowledge is oral knowledge. The process by which this knowledge is most reasonably collected is through individual and group depth interviews. The knowledge is anecdotal; this is partly a cultural factor and partly a factor of the high rate of illiteracy and lack of formal education among the enforcement personnel. (AINA, 1994; Boro, 1997: pers.com.) For the study to be useful, every effort must be made to capture this oral, anecdotal knowledge as completely as possible and without loss or distortion. (AINA, 1994) This requires the full cooperation of the enforcement personnel, and is dependent entirely on their interest and willingness to share their stories.

Many of the guards are not familiar with English; others who are may nonetheless be more comfortable working in Assamese. Similarly, they may be more comfortable working in an interview setting with their peers. For these reasons, it makes sense to conduct interviews in Assamese at the individual camps and through a local interpreter. It is also important that the interpreter be a neutral party to ensure that the stories are not qualified by deference to a superior. Clearly, the relationship between the interviewer and interviewee is vital to the process.

The interviewer may have a stronger belief in the quantity and quality of available knowledge than the person being interviewed. Part of an interviewer's job is to encourage the person being interviewed to be confident in giving his or her information even though it may seem to be incomplete or imprecise. Part of the process is to verify such information by comparing it with that shared by other people in the same [camp]. (AINA, 1994: 13)

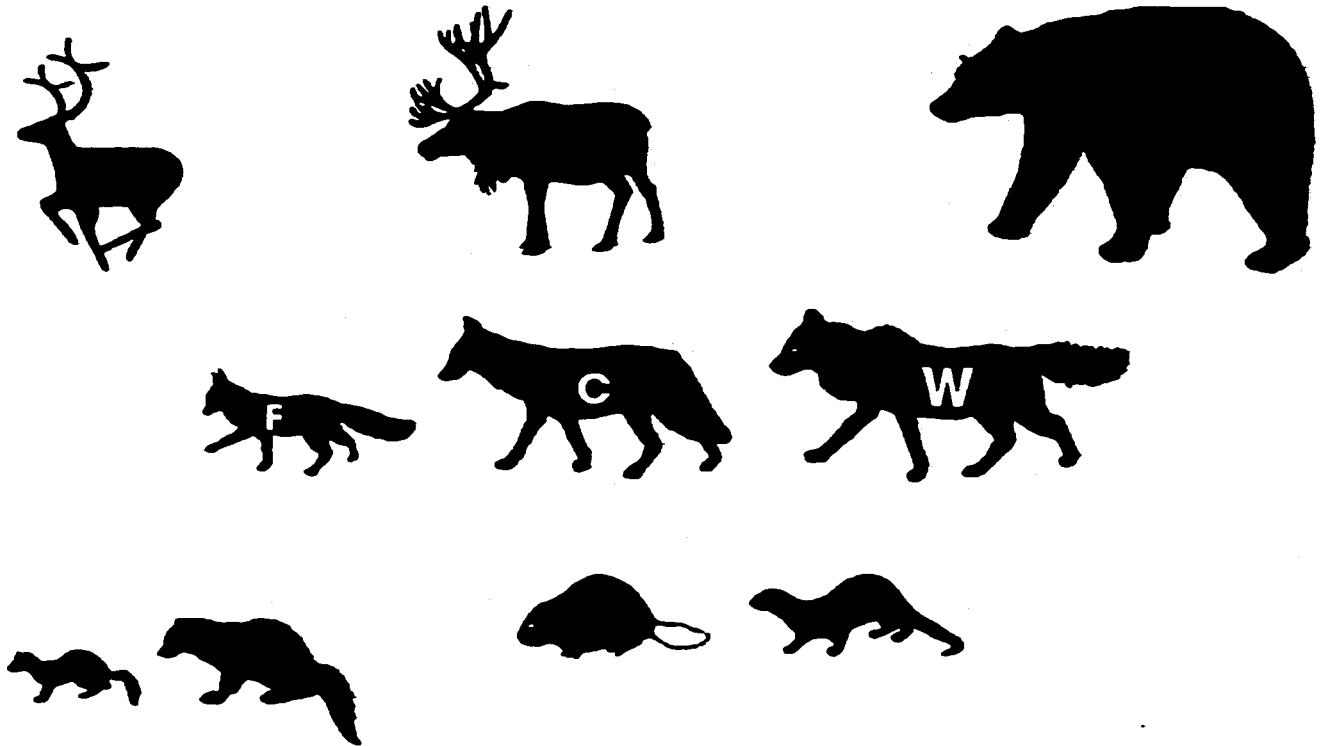
It is of the utmost importance that the enforcement personnel feel at ease. They will be more inclined to share their knowledge if they are assured that their contribution is valuable, and that their knowledge and experience has value for the future of KNP and the One-horned Rhinoceros. (AINA, 1994) They must be told that their information is needed to preserve the Park's integrity, and that their knowledge will continue to be valuable to conservation long after they are gone. (A day did not go by on patrol without the men sharing stories of their experience with wildlife and poachers.) It must be explained to them that this process requires them to tell stories, as they always have, but this time the stories and experience are being documented. (AINA, 1994) The interactive mapping process ensures that the enforcement personnel will have the opportunity to see the results of their participation.

The interviewer will lead the discussion with pointed interview questions worked out by the SAC. Extensive notes will be taken during the conversations, which will also be recorded to ensure a more complete and objective collection of the information, and a photographic record will be made of the entire process. Slides and video footage will aid in the process of map and report preparations. (AINA, 1994)

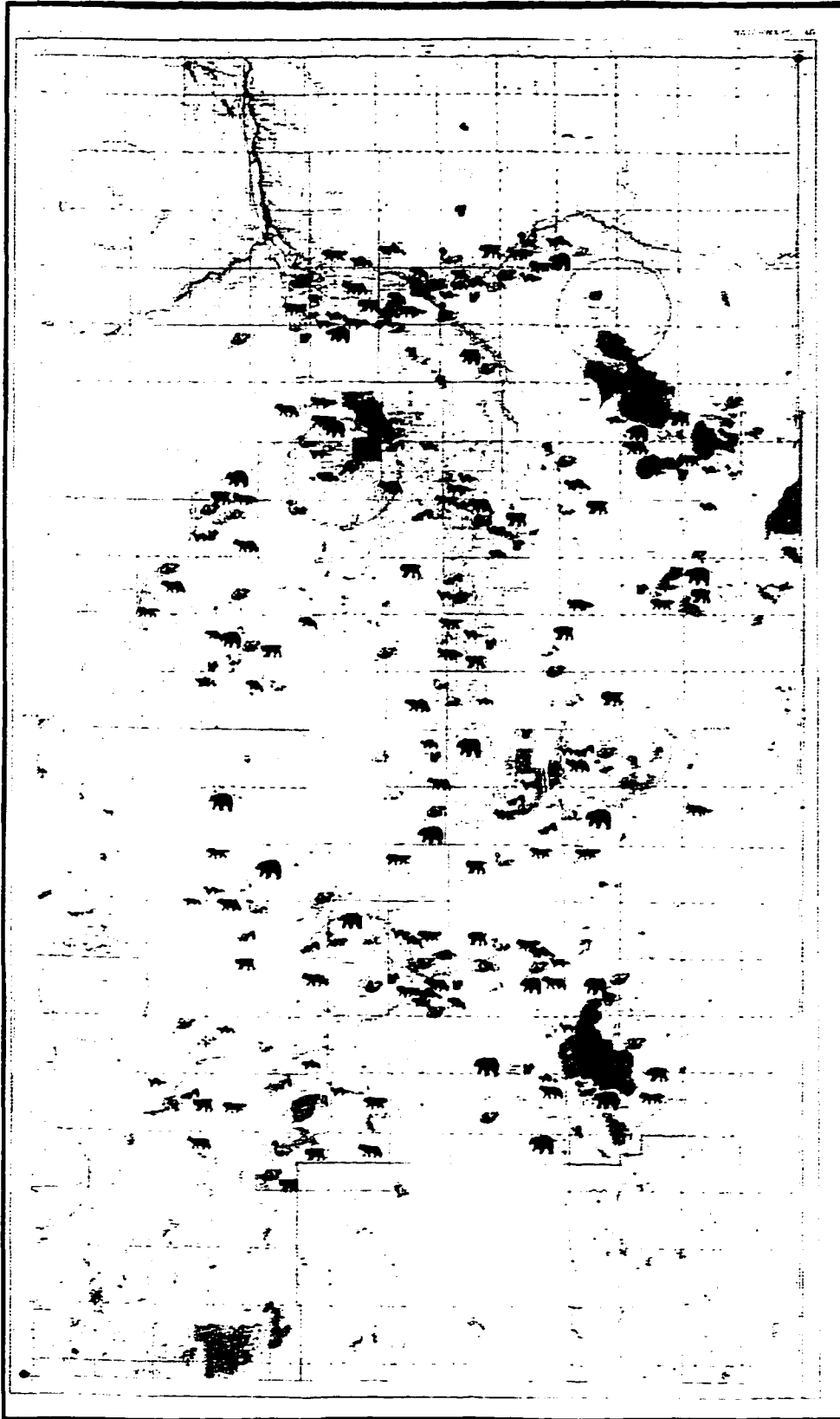
To a large degree, the interview process will focus on locating events and features geographically. To this end, the interviewers will use a base map of the particular Park range, overlaid with a transparent sheet that is referenced to fixed points on the base map. The TAC will advise as to materials and geo-referencing (to ensure consistency and accuracy). Locations will be marked on the map by affixing (adhesive) culturally appropriate icons as the discussion progresses and notes are made of the various features. The type of icons will be determined by the SAC. Figure 9 is an example of wildlife icons that have been used in the mapping of traditional land use and occupation studies with the Dene in NWT, Canada. (AINA, 1994: 26) The scale of the base maps will be determined by the SAC and TAC and will vary depending on the level of detail

required. As a general rule, 1:250,000 scale to 1:50,000 scale will be used — the former for locating patrol routes in a range, the latter for unique events or locations such as a poaching incident. (AINA, 1994)

Figure 9 Animal symbols for map overlays



**Figure 10 Overlay Mapping: Traditional land use and occupancy study map
— (single) fur bearing animals overlay**



**Traditional land use
and occupancy study,
northeastern Alberta**

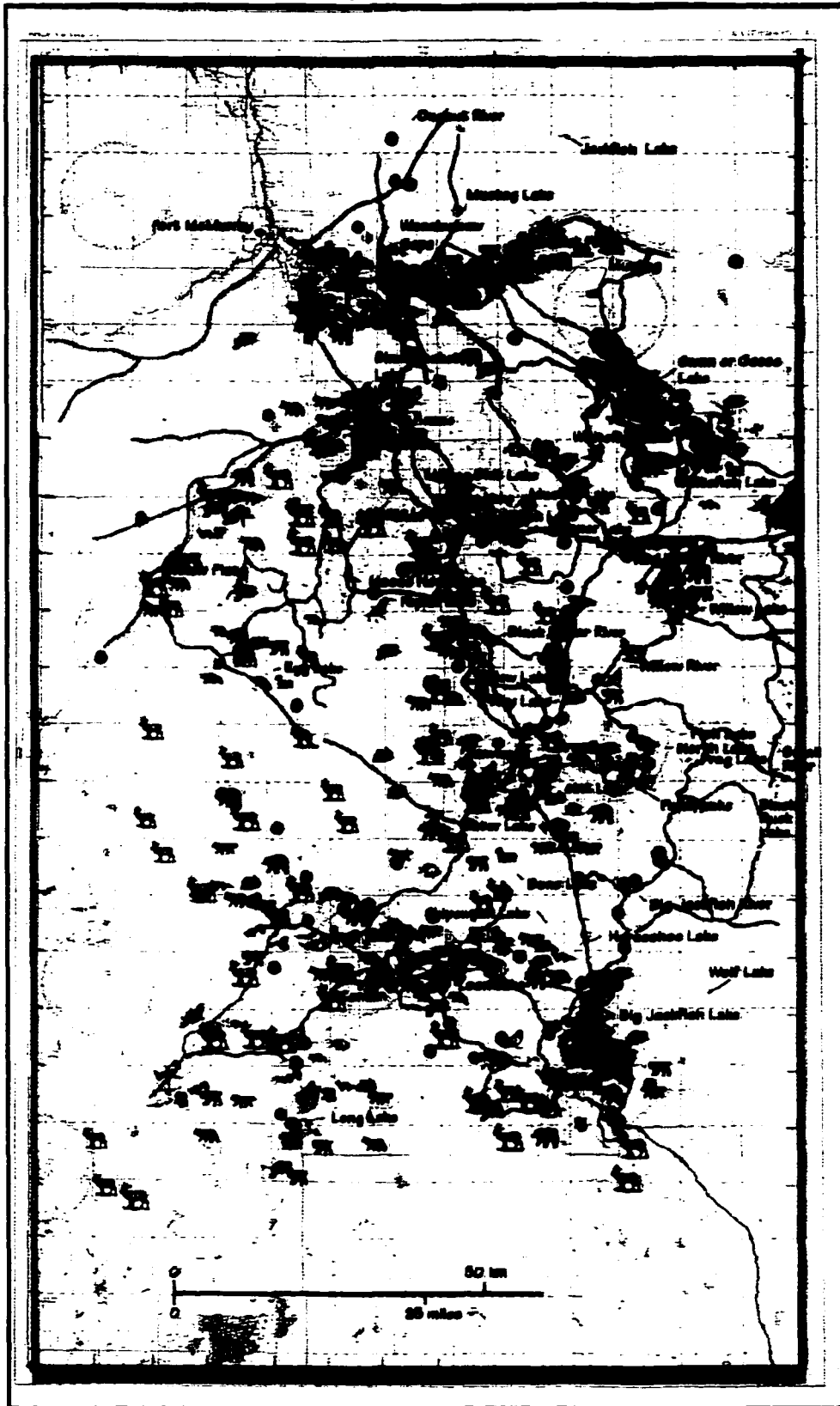
5. Fur-bearing animals

- | | | | |
|---------|--------------|----------|-----------|
| weasel | fox | coyote | muskrat |
| bear | porcupine | squirrel | beaver |
| wolf | marten | lynx | otter |
| raccoon | fisher | mink | groundhog |
| hare | squirrel (?) | skunk | wolverine |

**Arctic Institute of North
America, 1993**

**for the Athabasca Native
Development Corporation,
Fort McMurray,
Alberta**

Figure 11 Event Pattern Mapping: Traditional land use and occupancy study map — multiple overlays



Traditional land use and occupancy study, northeastern Alberta

- 1. Trails and graves**
- trails
 - graves (including community cemeteries)

- 2. Local place names**

- 3. Cabins**

- 4. Birds, big game and fish wildlife habitat**
- | | | | | | |
|-------------|----------|---------|---------|-----------|-----------|
| ▲ porcupine | ▲ moose | ▲ bear | ▲ wolf | ▲ caribou | ▲ muskrat |
| ▲ ptarmigan | ▲ grouse | ▲ deer | ▲ moose | ▲ moose | ▲ muskrat |
| ▲ hawk | ▲ owl | ▲ raven | ▲ crow | ▲ magpie | ▲ crow |
| ▲ eagle | ▲ osprey | ▲ jay | ▲ crow | ▲ crow | ▲ crow |
| ▲ grackle | ▲ crow | ▲ crow | ▲ crow | ▲ crow | ▲ crow |

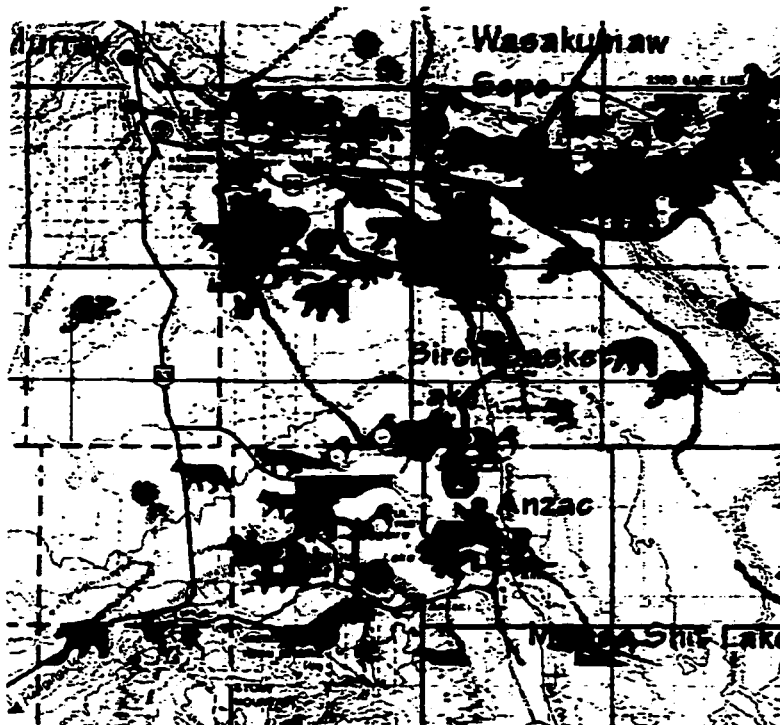
- 5. Fur-bearing animals**
- | | | | | | |
|-----------|-------------|------------|-----------|-----------|-----------|
| ▲ weasel | ▲ fox | ▲ mink | ▲ marten | ▲ fisher | ▲ bobcat |
| ▲ bear | ▲ porcupine | ▲ squirrel | ▲ beaver | ▲ beaver | ▲ beaver |
| ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat |
| ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat | ▲ muskrat |

- 6. Berries, medicine and minerals**
- | | | |
|---------------|------------|--------------|
| ● blueberries | ● rat root | ● hay |
| ● cranberries | ● mint | ● salt licks |

Arctic Institute of North America, 1983

for the Athabasca Native Development Corporation, Fort McMurray, Alberta

Figure 12 Detail: Traditional land use and occupancy study map — multiple overlays



When multiple land uses are overlaid one upon another on a base map, some areas of the map appear "swamped" with extensive use and occupancy, as in this case for the Clearwater River valley east of Fort McMurray and to a lesser extent in the region around Anzac, both in northeastern Alberta.

One set of maps will be maintained for each class of data, for example, patrol routes, rhino *dandis*, carcass discoveries, poacher encounters. **Figure 10** is an example of **Overlay mapping**: using icons to mark the location of fur-bearing animals on a base map. (AINA, 1994: 16) Once the interviews are complete, the various transparent sheets will collectively be geo-referenced to the base maps and overlaid to reveal patterns of events. **Figure 11** is an example of **Event pattern mapping**: using a base map and six layers of icons marking various attributes and features. (AINA, 1994: 17)

It is important to recognize the different types of information that may be present within an anecdote. Consider these two examples: e.g.1: "The poachers won't shoot the rhino when it is in the *beel* because they cannot get to the animal and retrieve the horn before the rhino drowns and sinks... so the *beels*, even though there may be many rhinos, are safer sometimes than the open... but it is very easy for the poachers to take a rhino at the latrine... the latrines are easy to find and the poachers can hide and wait there." (Mahanta, 1997: pers.com.) e.g.2: "Sometimes the poachers will come into the Park from the north... the Brahmaputra... they hide as local fishermen so that if we catch them we think they are just fishermen and we tell them to leave... we don't shoot them because we think they are villagers and this would be very bad for relations." (Boro, 1997: pers.com.)

In the first case, forest guard Mahanta is saying that *beels* are a high rhino-concentration area, but less of a poaching risk than the open park, notwithstanding that it is a more likely place to find a rhino. Furthermore, latrines are a high-rhino concentration area and a poaching risk. This could relate to strategy by using this information for the planning of patrol routes, ambush posts and watch towers. This simple statement provides a wealth of information with respect to patterns of both wildlife and poacher behaviour. The second example speaks to the need for greater interaction and communication with bordering villages. As well, it reveals a hole in the line of defence through which poachers can manipulate their way into and out of the park. From a strategy perspective, it would be important to know where fishing villages are located and where fishermen most often gain access to the Park.

Though these stories can be interpreted and plotted geographically, for obvious reasons it is important to document the stories as a whole and verbatim. The principal record of the interview, then, is the map supported by written (and recorded) notes. At the end of the interview process, the interviewers will prepare written summary reports to complement the final event maps for each of the interviews. In some cases, the interviewer will need to accompany the interviewee on patrol for additional information and documentation, including photographic records and the precise locating of events using GPS or Global Positioning technology (this information will later be entered into the GIS database for use in **Planning Strategy II**).

When the written summary reports are complete, the **Event pattern** maps will be taken back to the enforcement personnel to verify that the recording has been faithful to the oral account. Verifying the loyalty of both the maps and the written documents is crucial to avoid the situation of “garbage in, garbage out.”

In all cases, repeated checking is important since the underlying process is the conversion of oral anecdotal understanding to conventional written documents. This typically implies a greater precision and more rigid understanding than may be warranted under the circumstances. Checking of map data is also necessary to minimize human error on the part of the interviewer... (AINA, 1994: 19)

Once verified, these reports and maps will be submitted to the SAC for the next phase of the process, **Planning strategy I**. **Figure 12** is an example of a detail from **Figure 11** that can be employed in **Planning strategy I**: using the event pattern maps — after identifying events and relationships in areas of heavy activity — to begin to formulate general strategies with respect to anti-poaching and infrastructure maintenance and development. (AINA, 1994: 23)

Up to this point, the TAC and SAC will have been focusing on collecting information — the accumulation of field notes, field maps, and audio/visual records of the process will have been foremost in importance. This next stage, however, is equally important and vital to the process as a whole.

Organizing data for strategic planning

The TAC and SAC will determine where the overlay and event-pattern maps will be digitized for entry into a GIS database.²⁴ This will depend on a number of factors at the time, including whether appropriate resources exist in India or whether the maps will have to be transported back to Canada with members of the sister-park programme. The SAC and TAC will set a schedule and budget for database entry.

Once the information is entered into a GIS database, the SAC and TAC will work together to create output maps. The sort of mapping requests made of the system are not intended to be analytical in nature (not at first, at least). Initial output maps might include overlay combinations such as the following:

- **Layer 1: Infrastructure map**
 - sub layer: access roads*
 - sub layer: camps*
 - sub layer: watch towers*
 - sub layer: powerlines*
- **Layer 2: Environment map**
 - sub layer: beels*
 - sub layer: rivers*
 - sub layer: grassland*
- **Layer 3: Anti-poaching efforts**
 - sub layer: patrol routes*
- **Layer 4: Rhino activity**
 - sub layer: frequented beels*
 - sub layer: latrines*
 - sub layer: corridors*
 - sub layer: frequented feeding areas*
- **Layer 5: Poaching activity**
 - sub layer: points of known access*
 - sub layer: rhino carcass discovery*

²⁴Given the organizational strengths and graphic display output capabilities of even rudimentary GIS technologies, and given its utility as a planning tool, GIS will be used to organize the mapping data collected from enforcement personnel in KNP.

sub layer: poacher confrontation
sub layer: poaching pit discovery

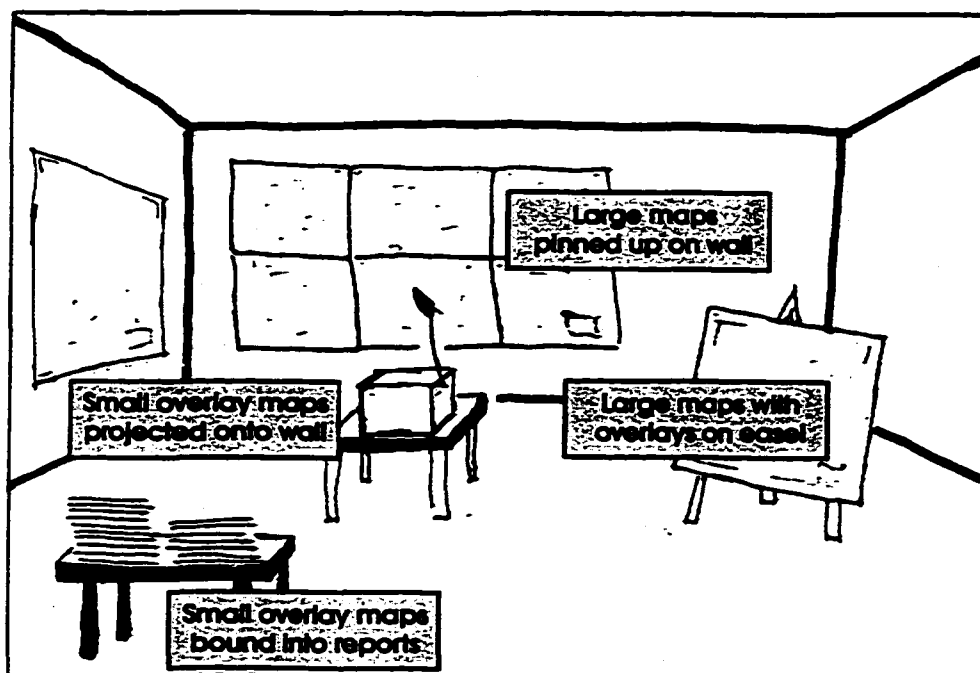
The five-layer (16 sub-layer) map (described above) is an example of why GIS technology is necessary. Each of the 16 sub layers described above would be generated from a huge data set comprising all of the relevant information collected in the field. Even if the interviews were restricted to the range officers, deputy rangers and forest guards, the number of data sets for review would be a minimum of 217 (7 range officers, 6 deputy rangers, 204 forest guards; see Table 5). That number, however, is understated, as it would only account for one data set per interview. In fact, there could be as many as 3,472 data sets (217 men x 16 layers) for review (in the above scenario). Clearly, it would be impossible for an individual or group of individuals to process that much information with the naked eye if it were presented in its raw form as 3,472 paper maps. Furthermore, for the forest guards' knowledge to be useful, it must be organized in such a way that the data is accessible.

I recommend that initial output maps not be analytical in nature, because the analysis must be made subject to numerous existing conditions including, for example, available resources and season (strategy would be different in January than during the monsoon and floods). Depending on where the database is compiled, this information may not be readily available. Furthermore, the analysis is to be undertaken by the SAC in the last phase of the entire process, **Planning strategy II**.

In the first phase of **Planning strategy II**, the SAC and TAC will make specific information/map output queries of the GIS database. These queries will be aimed at revealing patterns of events and relationships with respect to poaching. It is through this holistic review of the conservation situation in KNP — with respect to the enforcement personnel's knowledge of and experience in the Park — that the SAC will be able to identify holes in KNP's lines of defence. Ultimately, this collective knowledge will be used to fill those gaps and to plan a new anti-poaching strategy with an eye toward preempting poaching activity and not merely reacting to it.

Finally, the SAC will meet with senior enforcement personnel (both KNP and members of the sister-park exchange programme) to plan a new anti-poaching strategy.

Figure 13 Strategy meetings map-display options



Map information may be displayed in a variety of ways.

The end of the process will be marked by meetings between the SAC and senior enforcement personnel from each of KNP's ranges. These meetings will be held at the respective range headquarters, where various strategy maps will be displayed to introduce the enforcement personnel to the new anti-poaching strategy (*see Figure 13*). (AINA, 1994: 27)

The downside of using GIS in this way is that the enforcement personnel only have indirect access to it. While the data (maps, etc.) will be collected in the Park, conditions there preclude storage of either the maps or the GIS technology. This can be remedied, to some degree at least, by providing each of the range headquarters with a series of relevant (GIS-produced) strategy maps. These can take a variety of forms from wall-size maps of the entire range, to pocket-size print outs of patrol routes specific to each camp. Furthermore, each range office will be provided with strategy reports replete with a full complement of strategy maps for each camp within that range (*see Figure 13*).

Monitoring and feedback

As mentioned above, this project is intended as a pilot project. As such, the SAC will establish a monitoring and feedback group who will be responsible for soliciting the opinions of the enforcement personnel with respect to the pragmatism, and successes and failures of the new anti-poaching strategy. The monitoring and feedback group will prepare a report for submission to the SAC (according to timelines set by the SAC) detailing the effectiveness of the new strategy. The results documented by the monitoring and feedback group will assist the SAC in determining when and how to revise KNP's anti-poaching strategy.

Implementation

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has expressed interest in adopting my recommendations, and as such I am currently negotiating with UNESCO's Senior Advisor for Asian World Heritage Sites, Mr. Ishwaran Natarajani, over financial and organizational support toward the implementation of this intervention as a UN initiative (*see Appendix 4 — UNESCO letter of support*).

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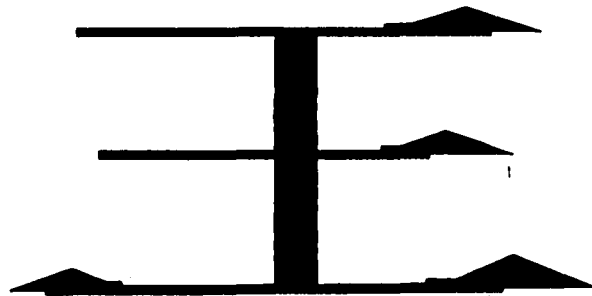
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Appendices

- Appendix 1 — SPECIES
- Appendix 2 — Tales from the field
- Appendix 3 — List of interview subjects
- Appendix 4 — UNESCO letter of support

Appendix 1 — SPECIES

SPECIES



STRATEGIC PROGRAM FOR ECOSYSTEM CONSERVATION OF INTERNATIONALLY ENDANGERED SPECIES

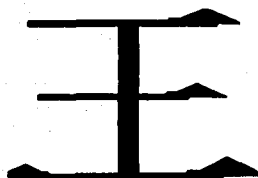
SPECIES is a strategy for restructuring international wildlife agreements and national policy to encourage aboriginal participation and approach endangered species conservation from an ecosystem perspective.

SPECIES is based on two fundamental principles:

I. Ecosystem-based management (EDM): Policy shall consider inseparable the conservation of endangered species, habitat, and aboriginal livelihood, as all ecosystem components are an integral part of the whole and shall be managed collectively; and,

II. Science-based policy (SBP): Endangered species conservation policy shall defer to the best available (and practical) scientific information. Where science is lacking or ambiguous, the "Precautionary Principle" shall apply.

SPECIES employs global, local and biotic-based strategies to address endangered species conservation policy.



GLOBAL STRATEGIES

LOCAL STRATEGIES

BIOTIC-based STRATEGIES

SPECIES three-tiered strategy is represented by the Chinese character "Wang," or king. A pattern similar to this distinctive marking is often carried on the forehead of the tiger (*Panthera tigris*).

MDP Research Proposal: Adam Brener (Calgary, AB - 252-8540); Environmental Science **Endangered Species Conservation Strategy:** employing aboriginal people and the law to conserve tigers

Project purpose/Justification

Social buy-in is at the heart of conservation strategy in developing nations; that is, encouraging community participation in programs that aim to harmonize human need with environmental conservation.

However, if people are living in a state of lack and their survival depends on short-term gains, such as earning money for food and medicine by poaching highly

marketable endangered species, then there is little motivation not to exploit the environment. Poverty is the greatest correlate to poaching. For this reason, various conservation projects operating in India, including Project Tiger, have marked less success than was originally expected.

The legal regime is the second factor that plays a pivotal role in conservation strategy. That political borders and ecological boundaries do not coincide is an axiom shared by both environmental conservation and international law. As such, nations conclude multilateral agreements to manage environmental resources from a global perspective, appreciating that whatever happens to the environment within our neighbors' borders will ultimately have an impact on our resources.

The advantage of multilateral agreements is that they are composed to attract many parties. However, to encourage participation, these agreements often contain concessional, subjective language that makes enforcement difficult. To be effective, a legal framework for concluding international endangered species agreements should be dynamic and be built on principles of

ecosystem-based management and science-based policy that commit nations to address the specific threats to the species and needs of the people.

**To keep every cog and wheel
is the first precaution of
intelligent tinkering.**

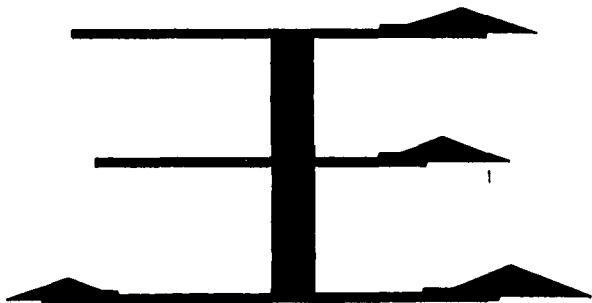
—Aldo Leopold, *A Sand County Almanac* (1949)

Naturally, if the social buy-in component is lacking then even the most well written and sound laws will be impotent. The solution may rest in linking social buy-in to conservation policy at every level; that is, from grassroots and frontline conservation efforts, through domestic policy, to the international legal regime.

For a conservation strategy to be effective it should: i) capitalize on the successes of existing wildlife conservation efforts and agreements; ii) provide local peoples with positive, participatory and meaningful alternatives to poaching; iii) foster domestic dedication to its objectives; and, iv) encourage international cooperation.

Because of an increasing global population and burgeoning demand for wildlife parts and products — a billion dollar industry second only to the drug trade — an exploration of alternative community development and law-making and enforcement strategies is vital to conserving endangered species. Pursuant to recommendations made by CITES (Convention on International Trade in Endangered Species) for research into improving the legal regime of tiger conservation, this MDP will develop a strategy (**SPECIES**) for restructuring endangered species conservation legislation from an ecosystem perspective and to provide local peoples with alternatives to poaching.

SPECIES



ELEMENTS OF THE STRATEGY

Global Strategies: Umbrella & Conjoined

1. Identify and compile the most meaningful elements of existing endangered species conservation agreements as an umbrella for new agreements.
2. Form umbrella agreement to structure specific multi/bilateral agreements respecting Ecosystem-based management and Science-based policy.
3. Form conjoined specific agreements in line with tone of umbrella agreement and national legislation.

Local Strategies: Adapt domestic law

1. Restructure and re-prioritize national legislation to reflect EBM and SBP.
2. Establish enforcement legislation respecting balance between realistic and sufficient deterrents, and excessive punitive measures unlikely to be enforced.
3. Establish legislation for monitoring and feedback program to identify/address legislative deficiencies.

Biotic-based Strategies: Social buy-in

1. Identify/mitigate law-enforcement concerns specific to EBM and SBP.
2. Identify habitat and species concerns, and address them within umbrella and conjoined agreements.
3. Employ locals as enforcement/monitoring personnel as an alternative to poaching and to encourage social buy-in.
4. Implement enforcement regime.
5. Implement monitoring and feedback program.

Objectives

1. To develop a general conservation strategy for endangered species. This will be accomplished through the fulfillment of three fundamental objectives:
 - 1.1 To investigate the international legal regime with respect to the environment;
 - 1.2 To investigate the international legal regime with respect to endangered species; and,
 - 1.3 To investigate conservation strategies for endangered species.
2. To test the global conservation strategy for endangered species in a case study using tigers. This will be achieved through the fulfillment of two fundamental objectives:
 - 2.1 To investigate the international legal regime with respect to tigers; and,
 - 2.2 To investigate the existing conservation strategies for tigers.
3. To make recommendations addressing the legal regime with respect to: (i) endangered species conservation, and (ii) aboriginal participation in ES conservation; and,
4. To make recommendations addressing the legal regime with respect to: (i) tiger conservation, and (ii) aboriginal participation in tiger conservation.

Methodology

The primary objectives of this Master's Degree Project will be fulfilled through a process of:

Phase I: exploring the motivation and justification for the three-tiered endangered species conservation strategy (**SPECIES**) proposed herein;

Phase II: testing the proposed conservation strategy using the Tiger as a case study; and,

Phase III: developing recommendations addressing the legal regime with respect to endangered species conservation in general, and tiger conservation in particular.

Phase I will comprise an extensive literature review that will include, without limitation:

1. exploring the history of and current developments in international environmental law;
2. reviewing the concept of custom and "soft law" within the context of international environmental law;
3. reviewing the international legal regime with respect to endangered species conservation policy; and,
4. reviewing endangered species conservation strategy at international, national and biotic levels with respect to fundamental issues (e.g.: poaching).
5. Finalizing the proposed endangered species conservation strategy—**SPECIES**—for testing in Phase II, based on the literature review.

SPECIES



THE NEED FOR A NEW STRATEGY

Tigers and Traditional Chinese Medicine

Due to the illegal trade in Traditional Chinese Medicine (TCM), the Tiger (*Panthera tigris*) stands near the brink of extinction. Since the turn of the century, its habitat and numbers have been reduced by up to 95 percent. In this century alone, three sub-species of tiger, the Balinese, Javan and Caspian have been driven into extinction. Tragically, the remaining five sub-species, which may number as few as 5,000 are at risk of meeting the same fate if a new approach is not taken to protect them. There are only an estimated 30 - 80 South China Tigers, 150 - 200 Siberian Tigers, and 600 - 650 Sumatran Tigers remaining in the wild.

Project executant: Adam Brener *

MDP supervisor: Steve Herrero (EVDS)

External advisor: J. Owen Saunders
(Canadian Institute of Resources Law)

Expected completion: September 1998

Research location: India
(Rajasthan & Madhya Pradesh)

Expected cost: \$6,950.00

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722 53 Avenue S.W.

Calgary, AB T2V 0C3

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Methodology

cont'd

Phase II will demonstrate **SPECIES** using the Tiger (*Pathera tigris*) as a case study, through a process of:

1. exploring the history of tiger conservation;
2. reviewing the current status of the Tiger worldwide;
3. reviewing the international legal regime with respect to tiger conservation (in both range and consumer states);
4. reviewing tiger conservation strategy at international, national and biotic levels with respect to fundamental issues (e.g.: educating, encouraging social buy-in, poaching); and,
5. applying **SPECIES** three-tiered strategy to the international and national legal regime of tiger conservation, and with respect to fundamental issues that can be addressed with law-based solutions.

Phase III will develop recommendations addressing the legal regime with respect to the conservation of endangered species in general, and the Tiger in particular, through a process of:

1. developing an interview schedule to discuss **SPECIES** with stakeholders in tiger conservation (two key questions will form the starting point for unstructured, key informant interviews: i) Why are current efforts failing? ii) What needs to be done to encourage social buy-in to conservation efforts?);
2. interviewing conservation stakeholders (frontline/backroom — e.g.: academics, administrators, enforcement personnel, hunters) with respect to applying **SPECIES** to current conservation efforts (to be conducted over a six week period of field research in India: Rajasthan & Madhya Pradesh); and,
3. revising **SPECIES** to accord with the findings of the case study and interview processes.
4. Developing recommendations (with respect to legal issues) for endangered species conservation in general, and tiger conservation in particular.

MDP Progress/timeline

Phase I: completed

Phase II:

Items 1 - 3: completed

Items 4 - 5: April 1997 - August 1997

Phase III:

Items 1 - 2: April 1997 - August 1997

Items 3 - 4: Sept. 1997 - August 1998

MDP defense: September 1998

Cooperating organizations

- Arctic Institute of North America
- Bayeux Arts, Inc. (Publishing)
- Canadian Institute of Resources Law
- Faculty of Environmental Design (U of C)
- Faculty of Law (University of Calgary)
- International Centre (U of C)
- The Law Firm of Macleod Dixon (Calgary)

Research proposal

SPECIES

A. Brener; 3

Appendix 2 — Tales from the field

The following is a transcription of my notes and the interviews I conducted over the course of an evening in June 1997 with Range Officer Boro and a group of his forest guards while on night patrol in Kaziranga National Park. I include these notes because the findings and interpretation presented heretofore, though factual, do not adequately reflect the reality in which Kaziranga's conservation enforcement personnel live. I believe that in order to appreciate the gravity of their situation and the urgent need for intervention, it is important to let them describe their reality in their own terms. The direct transcription of the interviews expresses their perspective, rather than my interpretation of it. My field notes, thoughts and asides are italicized to differentiate them from the translated/transcribed interviews:

They took me to where the rhinos cross the highway to get above the flood waters. But there were no rhinos. No rhinos = No poachers. No poachers = No danger. Boro scanned the distance.

"Look beyond the trees... into the grass," Boro pointed toward the watering hole at the edge of the embankment. "There, in the beel. You see it? The black? Hemanto, the binoculars..." He took the field glasses from my friend and interpreter, Hemanto Das, and handed them to me. They were filthy from the road and fogged with humidity. It was late at night but the temperature was still around 30-35 C and the humidity was oppressive. I wiped the perspiration, dried and salty from my eyes. Staring through the binoculars, beads of sweat running across and down my brow obscuring the lenses, my eyes focused, blurred, refocused. There it was. The solid black mass silhouetted against a background of gray — gray water, gray grass, gray trees — stood in the water up to its shoulders like some moored dreadnought. Fifteen metres away, barely discernible against the night's muted palette, a rhinoceros moved silently, imperceptibly across the beel.

Perception acuity is a wonderful thing; once your eyes know what to look for, they see it everywhere. I lowered the binoculars and looked down the hill, across the water and into the grass. The four-metre high Ekora or elephant grass, now like a wall of gray vertical blinds, parted

and a procession of solitary, lumbering, armor-plated giants horned their way into the water. There was nothing excited or anxious or purposeful about their gait. In fact, it seemed as though the rhinos had happened across the watering hole as much by chance as by design. They stepped into the water, swung their heads slowly from side to side, each almost appearing disappointed that it wasn't the first and only rhino to find this beel. A moment passed and the rhinos settled down to a midnight browse on water hyacinth. It was serene. It was sleepy. Excepting the heat and the incessant insects, the night was still and pleasant and standing before us there were four rhinos as big and as clear as day. I felt Boro watching me.

"Like shooting fish in a barrel," he nodded toward the rhinos, leaned forward, cocked his head, squinted one eye and mimed firing a rifle. "Bang!"

Had I a gun I could easily and quickly shoot all of them. If I was sitting in a tree, I could easily shoot all of these people standing and watching these rhinos — mere scarecrows guarding my bumper crop. My mind wandered. My pay for a four-horn haul would be about \$2,000. A rifle, a machete or ax or some such tool to hack off the horns, a bag for my loot — this is all I need. There are three forest guards and they only have one rifle; the other guys in my poaching party can handle them. A little bit of planning, a pay-off to one of the villagers for taking us to the rhinos, a very successful night. In real terms, on a night like this a poacher could make 800 times what a forest guard will earn for the same night's work. Rhinos = Poachers. Poachers = Danger.

The night remained still, but it was becoming less pleasant. Boro's attitude was relaxed, as was that of his guards. But in a strange way that was both comforting and disconcerting, they seemed detached from the conversation. As much as they went out of their way to answer my questions, their attention was focused elsewhere. They were aware of everything around us — every sound, every motion. I heard a noise ahead in the darkness, the sound of something falling through the branches of a tree. I aimed my flashlight onto the ground and saw where a mango had fallen. I lit the branches higher up to see an enormous flying fox — the Giant Indian Fruit Bat feeding on the ripe mangoes. As my light flashed across its dark brown fur-covered body, it

unfolded the span of its magnificent black fleshy wings — over a metre and a half from tip to tip — dropped from the tree, swooped over my head and disappeared into the night.

“You should be careful with that flashlight,” *Boro cautioned.*

“Thanks for the warning... You think there are any more up there?”

“It’s not the bats you have to worry about...” *he paused,* “it’s the poachers. Each party that goes out on patrol will have one gun, one walkie-talkie, and one torch. When we’re out in the field we keep in touch with the radio so that we know where everybody is, and every torch is accounted for. That way, if we see a light in the park, if it’s not one of ours, it must belong to a poacher. The poachers tape the torch to the barrel of the gun. They don’t really have to aim. Whatever the light shines on, the bullet will hit. It’s not so accurate... though accurate enough when your target weighs two tons and stands two-metres tall,” *he explained.*

“Not very sporting, is it?” *I interjected.*

“Poachers don’t play by any rules. But sometimes it backfires on them.”

“How’s that?” *I held my light out before me in my left hand as though it were taped to a rifle barrel. I sighted down the beam of the light and panned across Boro and the forest guards, stopping as I lit up the neck and shoulder of one of the rhinos in the grass.*

“I’ll tell you a story. A few years ago, before I came to this range, a party was out on night patrol. The moon was full, like tonight, meaning that they had to be especially careful as poachers more often come into the park under a full moon... it’s easier to see and they don’t need their torches... except to aim. The patrol was following a rhino *dandi*, a path, when they saw a light shining through the grass ahead. They stopped and the guard who was carrying the rifle aimed at the light and fired. He saw the light go out and heard the torch shatter. There was all kinds of commotion; it was crazy. They heard one man yelling, ‘I’m hit! I’m hit!’ and they heard other men running through the grass and shouting. They found the man who was carrying the torch. The bullet went through the front of the light, out the other end and into the his belly. The poacher died before they could get him any medical help. It is a very painful thing to be shot in the belly and it is a very bad thing to die in the arms of the man who shot you... it is also bad for us. The

other poachers were never found. But at least no rhinos died that night, none of our men were shot and we recovered one gun...

“You learn quickly not to carry the torch in front of your body,” *he added.*

I turned off my flashlight. We followed the road to a vantage point directly over the beel where we could get a better look at the rhinos, and stopped in front of the buttress of a towering Silk-cotton tree.

“Look at this tree,” *Boro commanded.* “There was once a senior forest guard who was training some new men for night patrol. They were out in the park and as they walked up to one of these Silk-cotton trees, he aimed his rifle up toward the branches and told the men to be very careful under these trees as often poachers will hide up there and wait in ambush for rhinos and for guards.”

“What happened?”

“When he finished speaking he looked up,” *Boro held out his hand with three fingers extended, he folded two of the three down into his fist then pointed up toward the branches and looked up into the tree.* “Three poachers were sitting in the tree... he shot two of them.”

“And the third?”

“The third shot him,” *he paused,* “dead. You must understand, every moment we are on duty, which is every moment we are in the park, we must be alert. The men take turns resting, cooking, watching the camp. There is no time to day dream. There is no time for a full-night’s sleep. How can there be? The poachers don’t sleep when they are in the park, how can we? We must be on guard all the time. We must be alert and our senses must be sharp.”

The air was alive with crickets and fat chirping cicadas and the sound of sloshing, munching, belching, flatulent rhinos. Our Suzuki Gypsy was parked on the shoulder about 10 metres away from our position above the rhinos, and in the beam of the headlight (one lamp was burnt out) small bats darted drunkenly after the frenzied swarm of moths and flies and mosquitoes. The ground seemed to be vibrating and for just a moment the teeming, noisy air was still but for the rumbling in the distance. The rhinos snorted knowingly, disapprovingly as the rumbling

neared. The serenity was shattered as a cacophony of horns and engines and steel and rubber exploded past us down and up National Highway 37.

Note: the national highway in Assam, where it abuts Kaziranga at least, is not particularly user- or wildlife-friendly. There are no animal-overpasses (for tigers, deer, elephants, rhinos), there is little if any lighting, there is barely room for one lane of traffic — to say nothing of two-way truck traffic — the black-top is in disrepair, the list goes on. Though annual flooding, poaching, and tiger and leopard predation are the top causes of wildlife death in Kaziranga, traffic-related deaths are not entirely uncommon. Flood is an annual phenomenon in Kaziranga, and though many animals take shelter inside the park's borders on constructed high lands, some animals migrate outside the park using ages-old wildlife corridors that have been interrupted by the highway. The situation of National Highway 37 between the park and the foothills of the Karbi Anglong district imperils migrating wildlife seeking higher ground. This situation is further complicated by the prevailing attitude of local and state police that patrolling the highway for wildlife and poachers is a forestry issue and not an issue that local law-enforcement officers should have to address, despite that the highway is outside of the forest department's purview.

The whole scene had become surreal. Ghostly rhinos roaming in the jungle beneath us and giant bats circling overhead bombarding us with ripened mangoes, juxtaposed against the spectre of poachers looming in the shadows, incessant irrepressible cows and the obscene traffic of trucks and buses — the illusion of nature shattered, the delusion of nature reinforced. Eden cordoned off with good intentions and an asphalt ribbon. Like so much in India, it is a collection of ingredients that should never have been thrown into the mix together. Nature, industry, urban, rural, wealth, poverty, wild, domestic — opposing and (in Kaziranga) incongruous elements mixed together in a recipe that can only result in disaster for wildlife, for nature, and for the men who live and die protecting them both.

As much as I was offended by the highway, the trucks, the buses, the air and noise pollution, and mostly by the myopic planning that is allowing the pauperization of the forest guard, of the rhino and of Kaziranga, I could not help but feel that all of it was significant as an unfortunate and accurate snapshot of conservation in the state of Assam. It is a microcosm comprising the forces that shape and influence Indian conservation in general: devotion to wildlife, dedication to environmental preservation, sacrifice of life, pursuit of material wealth, moral compromise, judicial neglect, lack of political will, corruption.

The moon darkened with storm clouds and the off-again, on-again downpour sheeted the distant rhinos against binoculars and flashlights. I moved under the canopy of a Silk-cotton tree but was nonetheless showered by a passing truck. Boro walked over to me and began to speak.

“Sometimes the rain is our ally.”

“Why’s that?”

“I’ll tell you a story.... It was October 19th, 1992. We had received information from a reliable source that a gang of poachers was coming into Kaziranga with a plan to collect horn from more than 15 rhinos,” he began. “The poachers were Nagas, from Nagaland near Burma. They set up their camp in the Karbi Anglong hills...” Boro nodded his head in the direction of the foothills, south across the highway.

*“As these Nagas are not locals and are not familiar with Kaziranga, they need the support of a local village... someplace to store their arms, to plan strategy, and to wait for the best time to enter the park. They went into a Karbi village looking for a ‘field man’ — that means, someone to guide them into the park, a person who has knowledge of rhino *dandis*, patrol times and routes and the locations of anti-poaching camps. You see, without a field man a poaching party will get lost in the jungle or will walk into a guard camp.”*

“Why are the villages sympathetic? Why do they cooperate with the poachers?” I asked. The villages are self-sufficient. They raise their own crops and food. They make or buy their own clothing. They have what they need. “Why would a villager help a poacher when there is so much

to lose... if they are caught... in terms of village standing and their relationship with the forestry department?"

"Some want the money. Some want retribution, they are vengeful. You see, elephants or rhinos will walk through a village. The houses are made of bamboo and thatch, and they do not stand up against animals that size. They eat the crops and destroy the homes. And tigers... well, there's the livestock. The villagers complain to the authorities, to us, to the police, but they are not compensated for their losses. Then, in comes a poacher or two or three asking around, looking for a good man to take them into the jungle to kill a rhino... unofficial compensation, so to speak. Now, one or two corrupt villagers does not a bad village make. But once a poaching party has established itself and has developed strong ties in a village, it can be a dangerous thing. You must also remember, however, that the only way we learn about this activity is with the help of honest villagers who come to us with these reports.

"So, in this case, three of the Naga poaching party went into a village looking for a field man. One of the villagers came to me to report what was happening. You see, I help them, they help me. I help them build bridges and repair roads. We have a good relationship, mostly built on trust and respect, partly on fear. I told them, you kill one of my rhinos... I kill three of you..." *he laughed.*

"Immediately I engaged one of my men to go back to the village undercover with this villager, posing as a field man. The poachers hired him and took him back to their camp in the Karbi Anglong hills. He had to convince them that he was like them and could be trusted. The poachers did not bring food. My man had to kill and eat dog with the poachers. When they trusted him, they discussed their plan openly.

"They planned to go into the park in the early morning, maybe three o'clock, or four or five. They knew they would be up early and would have a very long night, so they decided to turn in. After my 'field man' made his plans with the poaching party, he left their camp and came back to my range office. He told me about their plan, their arms and ammunition. There were seven poachers, they had five rifles and no shortage of ammunition. If the villager hadn't come to me, if

I hadn't heard about it, if I had done nothing, imagine the situation. Maybe my men would find them while out on patrol. Three men on patrol, one rifle, confronting seven men with five rifles. What do you think would be the outcome?" *he paused.*

"We have even had situations where the poachers have had silencers for their arms. At times they are very well armed, and their planning is very efficient. They can sit in a tree, just like this, and without being seen or heard they can hunt my men. They are like snipers.

"So these Naga poachers decided that they would come to my park in the morning and kill my rhinos. I knew that if they made it into Kaziranga, either I would not find them or my men might be killed. My best chance was to apprehend them and capture their arms before they left their camp. Their arms were very sophisticated compared to ours... bolt-action, rusty, old, unreliable. It was imperative to avoid a gunfight in the open park. We had to take them by surprise outside of the park.

"I thought that poachers usually came out under a full moon. Isn't it risky to poach in daylight? Even if they made it into the park by four a.m., it might be another hour, and that much brighter, before having the opportunity to make a kill. Wouldn't that be risky?" *I asked.*

One of the senior guards, 47-year old Pramod Chandra Mahanta, answered my question.

"It is true that it is easier for a poacher to work in the light of a full moon. In fact, some poachers have even set a target to take one rhino for every night of the full moon..."

"Really? Did they succeed?" *I asked.*

"That's another story," *Boro replied.*

"But you must remember, poachers are opportunists and will take a rhino whenever they can, regardless of day or night, weather, or our presence," *Mahanta explained. Boro continued.*

"I went to the police to enlist their help. We made our plan, and sometime after midnight we left. It had been raining and the road conditions up to the poachers' camp were terrible. The road was washed out, meaning we couldn't go in by jeep... though, had we tried we probably would have made too much noise and would have alerted the poachers to our raid. We were forced to walk the 11 kilometres uphill to the camp.

“Earlier, my officer, the ‘field man,’ had briefed the police on the poachers and their weapons. Duty forced the police to be there, but they were nonetheless afraid of an armed confrontation. The police told me that as poaching was a forestry issue, and since we were dealing directly with rhino poachers, my men and I should lead the way. ‘Besides,’ the police said, ‘the hills here are like the conditions inside the park — you and your men are more familiar with the terrain.’ It was very funny. As we approached the camp all of the police seemed to need to pass their water at the same time, so they all stopped and urinated in the bushes as we moved ahead... ‘Go ahead,’ they said, ‘we’ll catch up to you.’ This was the police strategy.

“The road had turned to mud with the rain and we were making the path into mire. Sinking into it our feet were becoming very heavy. Remember, we had to walk about 10 or 11 kilometres — pouring rain, up to our ankles in mud, walking uphill through the trees with no lights, myself and about 16 other men, eight of my staff, eight police, having to move silently. There was a river to the left of the poachers’ camp. The path narrowed as it reached the water and there was just a small plank of wood for a bridge to the other side. The rain had made it very slippery. Some of my men and the police slipped and fell into the water. The rain had made it very difficult to walk and climb and cross the stream. But I told you, the rain is also our ally... the rain helped us. You see, the poachers built their camp with a tin roof, and the TUT-TUT-TUT-TUT-TUT of the rain on the roof covered the noise we were making approaching the camp. So we crossed the stream and surveyed the camp. It was 2:30 a.m. There was no one on guard. Poachers are not smart or cautious.

“We converged on the hut — all of my men and two police went in. We were all armed and drew our weapons. We broke through the door. The poachers were all sleeping. ‘Hands up,’ I shouted. Immediately one of the poachers grabbed his gun and started firing at us. My men fired back. There were seven poachers, two police, me and my eight men in a small camp, maybe three metres by three metres in size. There was a post in the middle and a small kerosene lamp hanging from it. Everybody was yelling and trying to find cover. The poacher who shot at us only had a small hand gun, and after he ran out of bullets he made a run for it. This man had been

here for eight or nine days and knew the area very well. He was able to escape into the woods. All of the poachers started running. Two were shot and arrested. A third man was shot during his escape. At first we couldn't find him and thought that he either was dead, or got away with the others. After the initial operation, we heard him in the trees calling, 'I'm here! Help me! Help me! I'm here! I'm here!' He had been shot in the belly and he died in the hospital. The two surviving men were treated for gun-shot wounds in the hospital and later were released on bail. Four men escaped, but we captured all of their rifles, which were fully loaded.

"This happened while I was range officer at the Eastern Range — Agaratoli. The poaching situation is under control there since that incident and much better for us now, because the Nagas don't trust the field men. They are afraid, and for good reason, that any villager they approach might be a forestry department informer and is working for me. You see, I told them, 'If you kill one of my rhinos, I'll kill three of you.' So, now the villagers help me. I give them seeds for their crops — rice, vegetables, and tell them to cultivate their crops and not to go to the poachers. I help them, and now they help me."

After a few minutes of discussion between Boro and his guards, he turned to me and began speaking again.

"He mentioned poaching by moonlight," Boro nodded at Mahanta, alluding to the story about taking one rhino for every night of the full moon.

"You didn't answer my question: Were they successful?" I asked, remembering the earlier comment.

"No, but they're alive. This was a very dangerous operation. It was December 15th, 1993. I was at the eastern range, Agaratoli, but this happened around Baguri, the western range. Generally, poachers come from over there..." he nodded toward the Karbi Anglong hills. "But sometimes they come from the north bank of the Brahmaputra... as in this case.

"My informant came to me to tell me about a poaching party from the north that had crossed the river, poached five rhinos in the park and was now staying in a Karbi village. The poachers were looking for a buyer. I told my informant to set up a meeting and that I would pose as a

buyer. The only problem was that the villagers would recognize me and tip off the poachers that I was a forest ranger. So we had to set up a meeting in Bokakhat. I met one of the poachers and made a deal to purchase the horn for three lakh rupees [Rs 300,000 : \$12,000 Cdn]. I told him that I will need to verify that the horn is in fact genuine rhino horn and not a replica," he explained.

Rhinoceros horn is a mass of hair; it is not bone. It has a porous, pock-marked base that Boro says is extremely difficult to replicate. Nonetheless, a well-made replica is not easily identified by a novice, and given the going price for rhino horn, and the risk involved in its acquisition, it is not surprising that a poacher will attempt to pass off a sculpted cattle horn or old bamboo root as the real McCoy. Belinda (Wright) had mentioned that counterfeit horns are more commonly sold in processed form as Oriental medicine, however, rather than whole for carving, as it is very difficult to identify the origin of the product once it has been ground into powder.

"I told him that if the horn was good, I'd give him four lakhs. He reassured me that the horn was genuine, and that he would deliver one horn for every night of the full moon. He was very greedy. He explained that his party was 15-men strong, and they worked in shifts as they only had a few arms. Four men go into the park, kill a rhino, take its horn and leave. They tell the next shift where to find the rhinos, they hand over the weapons, and the next party goes in. I was trying to get information on how many men were in the camp, how many arms they had, the type of arms and the amount of ammunition. He said that he used a US carbine and fired at least 20 rounds into the rhino he killed. This told me that he had sophisticated weaponry and more ammunition than we had. I knew it was more important to recover the arms than to apprehend the poachers. You see, there is an unlimited number of poachers — if one dies, if one is killed, if one is arrested, more come. But they do not have an abundance of arms and it is becoming more difficult to obtain arms because of the Army's crackdown on extremists."

Note: (Telegraph Calcutta, November 16th, 1996):²⁵ the Indian Army had submitted a proposal in November 1996 to "adopt" Kaziranga and the neighboring Manas Wildlife Sanctuary

²⁵See Appendix X for news clippings.

to keep an eye on militants who use the parks as both hideouts and "convenience stores." Extremist groups including the National Democratic Front of Bodoland, the National Socialist Council of Nagaland (NSCN), and the United Liberation Front of Assam (ULFA), have been poaching rhinos to raise cash to support their insurgencies and to purchase arms and ammunition. The ULFA is demanding social reforms and change in Assam; the Bodoland uprising is built upon the group's efforts to create a separate state of Bodoland; and, the NSCN, like the other groups, is fighting for rights they argue are currently denied them. The ULFA and Bodoland activity during the eighties wreaked havoc throughout Assam, causing a breakdown of law and order across the state. Poachers pounced on the opportunity to acquire arms and ammunition during the chaos, and military extremists responded in kind by taking advantage of the lucrative trade in rhino horn. Though on the one hand this resulted in a new breed of poachers that are well-armed and well-trained in guerrilla warfare tactics, it also raised the question of bringing the Army into wildlife conservation if for no other reason than to attempt to stem the flow of arms to extremists and to control civil uprisings and unrest in Assam. Despite the fact that the Indian Army's proposal seems to have fallen by the wayside, it would have been interesting to see the effect of their involvement in anti-poaching activities on Indian conservation in general, particularly as the Army is hated by both the ULFA and the Bodos.

Boro told me that he believes each weapon recovered from a poacher will save as many as two or three rhinos (not to mention forest guards), regardless of whether the poacher escapes, or is apprehended and charged (and eventually released), or is killed. The gun-advocate's claim that "Guns don't kill people... People kill people," doesn't apply in Kaziranga, because it is the gun that makes the difference. There is no such creature as a "responsible" poacher. Poachers without guns don't kill rhinos or forest guards; poachers with guns, however, do. Boro continued his story.

"With this plan in mind, to recover as many arms and as much ammunition as we could, I went to the police to gain their cooperation and assistance. As I told you before, dealing with the

police can be tricky business because they know all too well the risks involved. Nonetheless, the task would be very difficult without them. In addition to their physical, armed support, they also provide us with legal support," *he paused.*

"What kind of legal support. You're doing your job. How is that illegal?" *I asked.*

"We are given arms, but are under orders that imply that we cannot open fire unless we are attacked first," *he explained.*

"You can't shoot until you're shot at?"

"Basically.... Officially, at any rate..."

I remember reading a press clipping from late 1996: in January 1996, two forest guards in Dehradun range in the state of Uttar Pradesh (northwest of Assam) opened fire on members of the timber mafia. Two of the timber poachers were killed and the two forest guards were arrested under section 302 of the Indian Penal Code - murder.²⁶

"As you can imagine, this has created a troublesome situation. But if the police are with us on a raid to witness that we were defending ourselves, there is no question of murder.

"So, with one police officer with me — undercover, posing as a field man — I went to the poaching camp in the Karbi Anglong hills to see the horn. It was genuine. This meant that I would have to mobilize some of my men immediately to find the carcass and to step up the patrol in the area of the kill to prevent any other rhinos from being taken. I did not know if one of the other four-man poaching parties was on the move. If the poachers were already in the park, they would know where to find the rhinos. It could be very dangerous for my men. I knew the poachers had a US Carbine. Our only advantage was that the poachers would not know to expect us. I knew we had to move quickly.

"I told the poachers that I would buy whatever horns they had for sale, and to send for me when they were ready to make the exchange. We left the poaching camp and returned to our base. We set our plan, I mobilized my men, and at about eight in the evening we left from the Agaratoli Range Office to return to the poaching camp. There were about 14 of us, police and forest

²⁶This was later confirmed: Pioneer New Delhi, 1996: 11/23

personnel, in total. We arrived at the camp at 1:30 a.m. Immediately we surrounded the house of the main poacher and moved in to complete the raid. But the house was empty... there were no poachers."

"Where were they?" *I asked.* "Had they left? Were they already in the park?"

"No, they were sleeping... outside... in a thatched rice hut. The commotion we caused in our confusion and surprise alerted the poachers to our presence, and they started running into the woods. Somebody started yelling, 'Here, the poachers are here, in the hut!' I ran into one of the rice domes and dove on top of a poacher, tackling him before he could run. Before my men got to me I started fighting with the poacher. He was trying to get control of his US Carbine to shoot me, but I was able to wrestle it away from him. I called to my men, 'Come here! Come here, quickly! I've got one!' We raided three houses in the village and caught six poachers — three were from the north bank [of the Brahmaputra river], they were fishermen. They helped the poachers cross the river into Baguri to poach. The fishermen stay in the backside of the Karbi hills, and wait until the poachers are ready to return. They came a very long way just to be beaten, arrested and jailed," *he smiled and the men chuckled quietly behind us.*

"What was the tally at the end of the day?" *I asked Boro.*

"We caught six poachers, and recovered one US Carbine and ammunition, one single barrel shotgun and ammunition, and one revolver. We weren't able to recover the horn they showed me earlier, and the horn being genuine meant that we lost one rhino, but at least we cut their goal short of taking one horn for every night of the full moon," *he told me, pleased with himself and his men, and happy to be recounting another successful operation. Indeed every successful operation is monumental when juxtaposed against the consequences of unsuccessful operations.*

Appendix 3 — List of interview subjects

Ali, H. *Forest Guard: Kaziranga National Park. 1997*

Barua, M. *Member: Indian Wildlife Board/Founder: Wildgrass, Kaziranga. 1997*

Bonal, B.S. *Director: Kaziranga National Park. 1997*

Boro, D. *Range Officer: Kaziranga National Park. 1997*

Chakraborty, D. *Attached Range Officer: Kaziranga National Park. 1997*

Das, H. *Interpreter: Wildgrass, Kaziranga. 1997*

Dhar, C. *Forest Guard: Kaziranga National Park. 1997*

Dutta, P. *Forest Guard: Kaziranga National Park. 1997*

Geist, V. *Professor: University of Calgary, Faculty of Environmental Design. 1996*

Hazarika, P. *Forest Guard: Kaziranga National Park. 1997*

Lahan, P. *Chief Conservator of Forests: Assam Forest Department, Kaziranga National Park. 1997*

Mahanta, P.C. *Forest Guard: Kaziranga National Park. 1997*

Mathew, T. *Director: World Wildlife Fund — India. 1997*

Menon, V. *Senior Technical Consultant: Asian Elephant Conservation Centre; Honorary Wildlife Warden, Delhi. 1997*

Sharma, P. *Range Officer: Kaziranga National Park. 1997*

Stewart, C. *Director: Mistakis Institute of the Rockies. 1998*

Tanwar, *Divisional Forest Officer: Kaziranga National Park. 1997*

Van Tighem, K. *Biologist: Waterton Lakes National Park, AB. 1998*

Wright, B. *Founder: Wildlife Protection Society of India. 1997*

Appendix 4 — UNESCO letter of support



United Nations Educational, Scientific and Cultural Organization
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TO WHOM IT MAY CONCERN

This is to acknowledge that I have been communicating with Mr. Adam Brener, of 722, 53rd Avenue S.W., Calgary, Alberta, over the last few months. Mr Brener's Master's Thesis on the Conservation of Kaziranga National Park in Assam, India, is of interest to me. Kaziranga is one of the 134 natural and mixed sites inscribed on UNESCO's World Heritage List.

I am particularly interested by Mr. Brener's proposal to use iconographic mapping to capture and graphically express the acquired environmental knowledge of forest guards. Mr. Brener says that he has developed this approach using a modified community participation methodology. In my view the global emphasis on utilizing the knowledge of local communities has unfortunately not given due recognition to the vast store of information and knowledge of guards and similar mid-to-low level parks personnel. Approaches to document the knowledge of such personnel has significance to the future development of the discipline of protected area management and to documenting case studies illustrating best management practice.

I have had preliminary discussions with some Indian colleagues who are curious and interested in testing, subject to clarification and resolution of various other matters related to the designing and launching of an international co-operation project, the application of the methodology proposed by Mr. Brener in Kaziranga National Park. I feel that the methodology could have applications in other sites which have been successful in rhino conservation in South Asia; i.e. Royal Chitwan National Park of Nepal, which is also a World Heritage site. Nearly 80% (about 1,600 individuals) of the wild rhino population of South Asia occur in Kaziranga (1,200) and Royal Chitwan (400).

I wish Mr. Brener success in his studies and his career. I look forward to opportunities for collaborating with him and others concerned in testing the effectiveness of his methodology for documenting the tacit knowledge of guards and other park personnel.

I thank you for taking into consideration my views on Mr. Brener's research.

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