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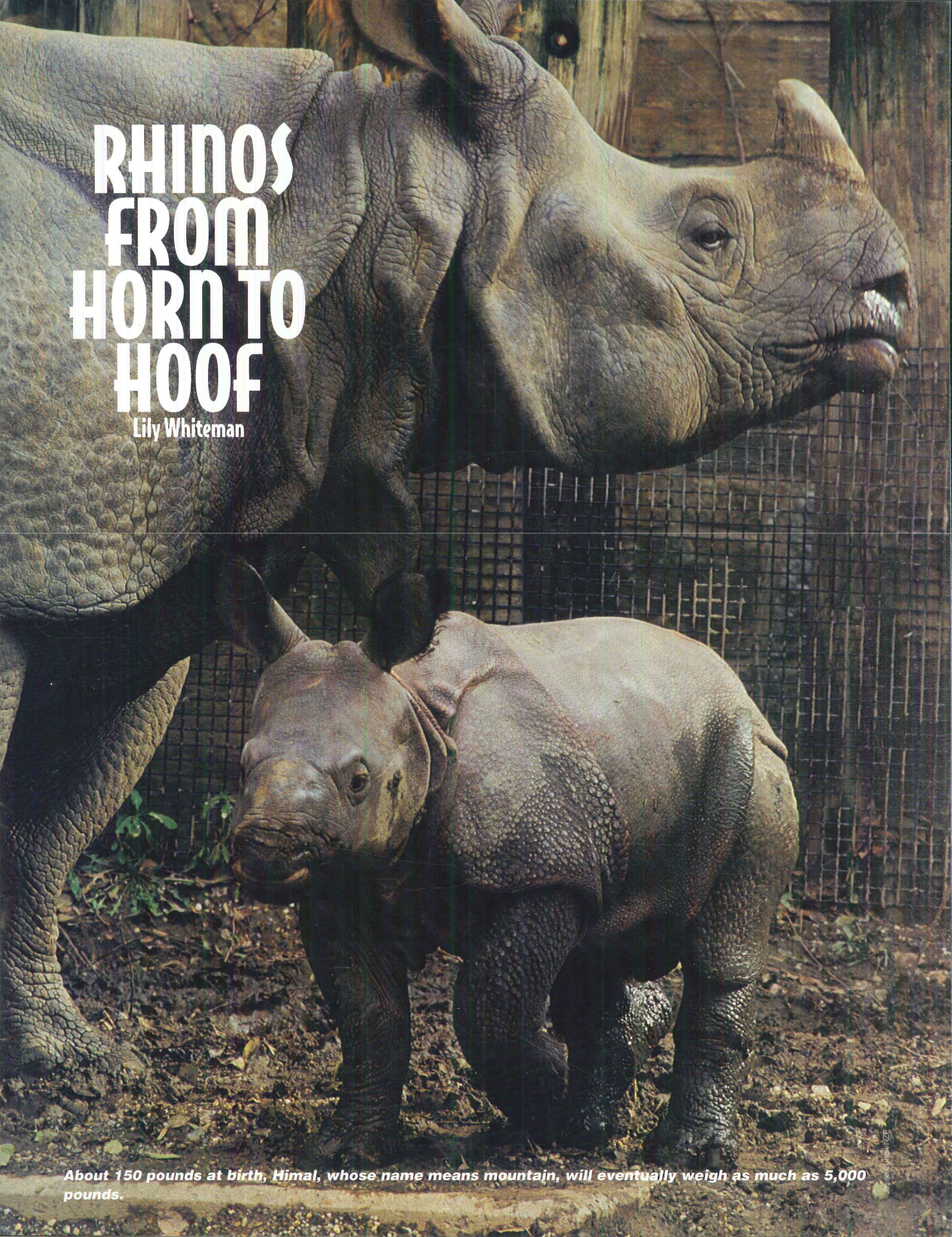
DEPARTMENTS

This bronze Chinese vessel in the shape of a rhino dates back to the late Shang dynasty, circa 11th century B.C.

RHINOS FROM HORN TO HOOF

Lily Whiteman



About 150 pounds at birth, Himal, whose name means mountain, will eventually weigh as much as 5,000 pounds.

Jessie Chilton/NZP

Jessie Cohen/NZP

Born in 1986 in Nepal's Royal Chitwan National Park, new mothers Mechi and Kali were barely out of babyhood when they came to the National Zoo in 1987.

"They're so ugly, they're cute," squeals a visitor, while watching Chitwan and her half-brother Himal, the National Zoo's two newborn greater one-horned Asian rhinoceroses (*Rhinoceros unicornis*). These quirky comments could only be inspired by such strangely contoured animals. Sporting oversized ears, hornless heads, and relatively narrow girths, Chitwan and Himal are rapidly growing into their rivetted skins. Since Chitwan was born to her mother, Mechi, on September 18, and Himal to his mother, Kali, on October 31, each newborn has gained about five pounds daily. At about six months, they will each start to sprout a horn composed of a fusion of hard hairs.

Although 16-year-old Sport fathered both calves, a jealous love triangle never developed among the three new parents. Rhinos are not romantics. After mating, males regain their single status, and are free to "see other rhinos," without strings attached. As a disinterested dad-to-be, Sport was moved from the National Zoo to the Philadelphia Zoo last July to make room for the births and management of his progeny. Sport will return to the National Zoo in about two years, after the calves are weaned.

Unlike Sport, Mechi and Kali conscientiously assumed parental responsibilities from day one. After giving birth, for example, each new mother swallowed her placenta, thereby consuming nutrients and hormones that probably helped trigger her milk production for nursing, suspects National Zoo Assistant Curator of Mammals John Lehnhardt. Maternal callings probably also explain what Lehnhardt calls "tiger watches." When, for example, loud noises from the urban jungle of Washington, D.C., startle Mechi, she "slowly ventures from her calf, and looks around with her head held high, ears out, nostrils flared," apparently straining to sense whether predatory tigers made the suspicious sounds. Maternal concern in the wild is frequently reflected in the single-file formation assumed by mother and calf; the elder animal usually walks behind the younger, dutifully ensuring that the calf stays on track and out of trouble. By contrast, Lehnhardt observes that, for mysterious reasons, the Zoo calves tend to follow their respective mothers, at least at this stage.

The two new mothers also seem to influence the personalities of their calves. For example, Lehnhardt describes Kali as a relatively nervous and agitated individual. Likewise, her four-legged bundle of joy remains particularly active, "frolicking like a colt" during daily baths. By comparison, both Mechi and her calf are more subdued.

RHINOS ON THE MOVE

The births of Chitwan and Himal are part of a breeding program that is designed to maximize the genetic diversity of greater one-

Chitwan was named for the park in which her mother was born. She is the first rhino born at the Zoo since 1974. Chitwan means heart of the forest.

John Seidensticker

While adults are immune from predation, young rhinos are vulnerable to the tigers that are also protected in Chitwan and other national parks.

horned Asian rhinos, an endangered species, in zoos. Both born in Nepal in 1986, Mechi and Kali were given by the King of Nepal to the National Zoo in 1987 to expand the gene pool of the U.S. rhino population. Sport came to the National Zoo from the San Diego Wild Animal Park in 1985. Each year, about seven of the 45 greater one-horned Asian rhinos that live in North American zoos are similarly transferred between facilities for planned matings. Over the last 12 years, conservationists have also translocated wild populations from Nepal's Royal Chitwan National Park to two other locations in India and Nepal, where these animals formerly ranged. With at least six new births among reintroduced populations, these projects have born fruit.

RHINO STRENGTHS AND WEAKNESSES

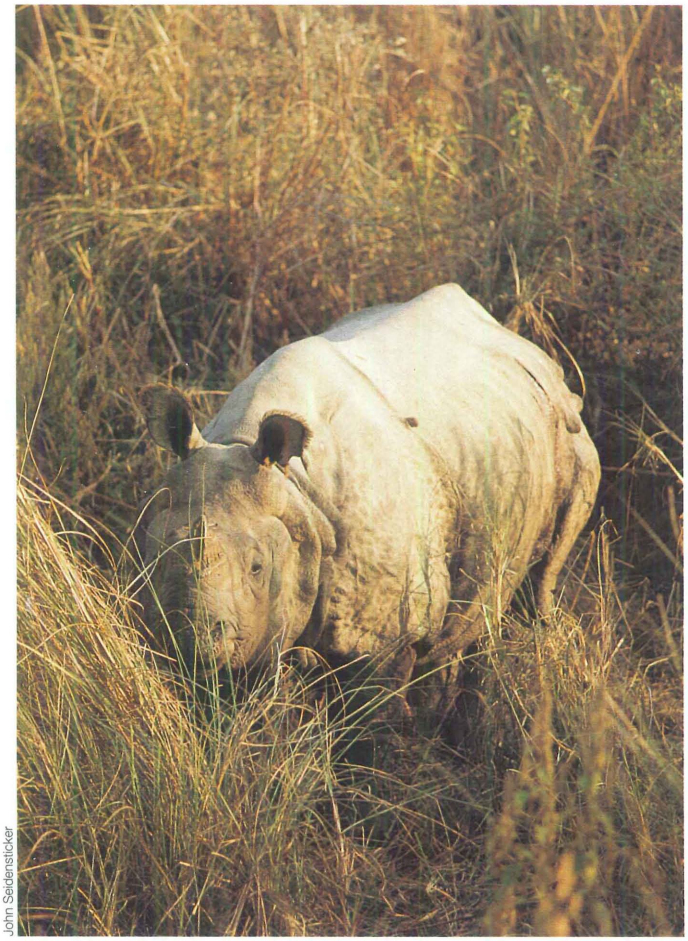
Why go to such lengths to help perpetuate rhinos? Eric Dinerstein, a rhino researcher and the World Wildlife Fund's conservation director, appreciates these creatures for, among other traits, their ability to "open a window on the past." With ancestors that roamed the globe 50 million years ago, rhinos are among the most ancient of existing land mammals. But though a nasal horn and folded, armor-like skin hardly contribute to a contemporary look, the greater one-horned Asian rhino is not, by any means, anachronistic. In this creature, evolution has engineered an animal that remains well-equipped and ecologically essential to its wetland, grassland, and forest habitats.

Indeed, for all their ungainliness, these three-toed ungulates are amazingly athletic. The rhino's stout, pig-like legs can carry it up to 35 miles per hour, and enable it to jump over ditches, careen around corners, traverse mighty rivers, and forge muddy swamps that might swallow lesser creatures. So agile are rhinos that they usually run from threats rather than stand and fight. But besides competing members of their own species, and calf-snatching tigers, few creatures—except gun-toting humans—ever risk runins with rhinos; most animals apparently recognize that this beast's tough hide and monstrous charging power make for a foe that is better left alone. And while the greater one-horned Asian rhino—unlike the other four rhino varieties—does not use its horn as a weapon, it does employ its razor-sharp teeth.

Probably because the wetlands, tall grasslands, and forests favored by rhinos rarely afford wide panoramas, these creatures have not evolved sharp eyesight, and cannot discern details beyond about 100 feet. But what these myopic animals miss with their eyes, they detect by other means. The rhino's sense of smell may best that of a bloodhound. And their ever-twitching, tufted ears remain alert to extremely faint sounds.

Nevertheless, the rhino's shortsightedness may explain why, according to Dinerstein, these creatures are "easily startled" by animals and objects that, from their perspective, seem to emerge

Himal will not be considered an adult until he is about eight years old. He may live 45 years or longer.



John Seidensticker

Much of the marshy, tall-grass habitat of greater one-horned Asian rhinos has been lost to agricultural development.

from nowhere and lack defining form. Blind rages can even compel honking rhinos to charge innocuous creatures, such as butterflies, with the same ferocity that they turn on tigers.

ECOLOGICAL FUNCTIONS

Lacking sweat glands, greater one-horned Asian rhinoceroses—more wallowers than warriors—usually pass the heat of the day soaking in water or mud. Such baths cool these behemoths, wash away pesky insects, and coat their skin with mud—nature's own high-SPF sunscreen.

During the cool of the evening, rhinos commute to jungles and grasslands, where they usually remain until morning. Grasping fruit, vegetables, twigs, and grasses with a loose, prehensile upper lip, each of these herbivores consumes about 40 pounds during a 24-hour period. In so doing, they help shape the bush in many ways. For example, rhinos constantly trample, snap, and bend the branches of a palatable evergreen tree species known as the Litsea. Many Litseas are thereby prevented from achieving their full 80-foot height. By contrast, less-tasty tree types are more likely to reach the canopy. "What rhinos like versus don't like to eat helps determine canopy composition, just as do factors such as light, temperature, and rainfall," observes Dinerstein. In addition, rhinos can crack open hard, large fruits, such as those of the deciduous Trewia tree, which cannot be pierced by weaker-jawed animals. They thereby release seeds that would otherwise rot without germinating.

As a veritable fertilizer factory, each rhino produces up to about 60 pounds of dung daily. Defecation usually occurs at shared latrines that bear the contributions of many. Lehnhardt compares these communal piles "to a social registry in the village square." According to this theory, each deposit is like a calling card that—with a signature scent—notifies the community of its donor's presence. Individuals advertise their availability for mating through variations in their scents. Such is the language of love for the olfactory-oriented rhino.

Dinerstein's research indicates that communal dung piles benefit other creatures besides just their creators. For example, these heaps provide habitat for rodents and estivating amphibians, and may serve as incubators for turtle eggs. In addition, seedlings ingested by rhinos are fertilized by the dung in which they are eventually deposited. Rhino manure similarly nurtures seedlings that sprout from seeds dropped in the dung of birds that also frequent the latrines.

In providing such varied ecological services, rhinos resemble many other large herbivores that were once pillars of their communities, but have since gone extinct. Scientists believe that the disappearance of these animals preceded the demise of many other, smaller species. Likewise, the loss of rhinos could hasten the decline of some of their dependents.

SOCIAL LIFE

Greater one-horned Asian rhinos are not gregarious animals. Staking out temporary territories, they usually favor solitude. Males are particularly intolerant of one another, competing fiercely for dominance by comparing the size of their teeth. During such macho conflicts, the greater one-horned Asian rhino's thick folds, which are peculiar to this species, protect critical body parts, such as the neck, legs, and genitals, from serious bites.

Rhinos do sometimes congregate. But "we don't know if congregating individuals are related, or what their interactions mean," says Lehnhardt. Also puzzling are the meanings of infrasonic messages exchanged by rhinos. According to researchers, these recently discovered communications "have characteristics of dialogue" because they "alternate between the participants and display parallelism and interruption." Such mysteries are just a few of the many that still surround rhinos, whose thickly vegetated habitats have limited research of their habits.

Still, scientists generally agree that the intellectual life of rhinos—whose nasal cavities are more voluminous than their brains—are, at best, limited. "Rhinos can't problem-solve like elephants, nor are they as intelligent as hippopotamuses," says Lehnhardt. For example, a randy male rhino would remain unable to reach a willing female who dwelled in a neighboring outdoor enclosure—even if the indoor portions of their enclosures allowed access. By contrast, elephants would easily solve such spatial puzzles.

Rhinos are not, however, completely remote. For example, when Mechi and Kali were half grown, Associate Director of the National Zoo's Conservation and Research Center Chris Wemmer trained them to board crates for transport from Nepal to the National Zoo in just two days. "The rhinos loved being scratched

Lori Price

Conservation programs in the wild, and breeding programs in zoos, give hope for the survival of greater one-horned Asian rhinos.

and hand-fed," Wemmer affectionately remembers. But wary of these potentially cantankerous two-ton tanks, National Zoo keepers do not currently enter their enclosures. "It's too dangerous," explains Lehnhardt.

SURVIVAL THREATS

The worth of a species, such as the greater one-horned Asian rhino, cannot be judged just by its intelligence and temperament. Indeed, by most measures, rhinos rank as treasures. But apparently valuing the whole less than the sum of its parts, people still kill rhinos for their body parts, as they have done for thousands of years. Markets for rhino parts are currently sustained primarily by Yemen and Oman, where horns are carved into ceremonial dagger handles, and by China, Taiwan, Thailand, and South Korea, where ground horns are believed to have medicinal powers, including fever-reducing effects. Rhino hide, urine, and hooves are valued for miscellaneous purposes. But contrary to popular belief, rhino horns, which are still literally worth more than their weight in gold, are rarely used as aphrodisiacs.

The greater one-horned Asian rhino's former range once spanned the entire northern part of the Indian subcontinent—extending from as far west as Pakistan to the north-eastern tip of India, and possibly even into China. Today, fewer than 2,000 of these animals remain—even though hunting and trading of them is illegal throughout the rhino's range and beyond. The largest surviving populations live in Nepal's Royal Chitwan National Park, which holds about 450 animals, and India's Kaziranga National Park, which holds about 1,100 animals. The rest of the greater one-horned Asian rhino population is restricted to one other Nepalese park and six other Indian parks, which dot the species's former territory.

Although several periods have been pivotal for rhinos, the most recent bad spell occurred in the early 1990s. From 1990 to 1993, poachers in India killed 209 individuals, equivalent to almost 15 percent of that country's remaining population. In 1992, a poaching surge claimed 24 Chitwan rhinos, equivalent to nearly five percent of the park's remaining population.

Many of the poor subsistence farmers living near rhinos have traditionally participated in, or at least tolerated, poaching. "It's very difficult to poach in most Asian countries without villagers knowing about it," says Dinerstein. "There aren't many places left that are so isolated that poachers carrying guns, or poachers' tracks, would go unnoticed."

Rhinos also remain vulnerable to the lawlessness that accompanies civil unrest in developing nations. Some of India's well-armed, extremist ethnic groups have even sometimes helped

finance their illegal operations through horn sales. And with poaching offering profit margins comparable to those of the narcotics and weapons trades, some illegal hunters opportunistically move between these illicit industries. Moreover, the sheer scale of illegal trade is daunting. "It is impossible to inspect more than five percent of international shipments for outlawed imports of endangered species products," laments Genette Hemley, the World Wildlife Fund's director of international wildlife policy.

Rhinos are also seriously threatened by habitat loss. The human population surrounding Chitwan, for example, doubles every 24 years. As rice paddies are expanded and more brush is harvested for fuelwood and fodder, rhino haunts inevitably shrink.

REASONS FOR OPTIMISM

Despite such discouraging trends, much hope remains for greater one-horned Asian rhinos. First, over the last few years, Nepal and India have redoubled anti-poaching efforts. Dinerstein explains: "These governments recognize their responsibility to conserve species that don't occur elsewhere. Moreover, if Chitwan were composed of only rice paddies and forests without exotic wildlife, the park would lose most of the 66,000 tourists who visit annually. And these nations' own conservationists pressure them. Now when rhinos are poached, Parliament summons the Director of National Parks to explain."

Other precedent-setting developments include the imposition of U.S. trade restrictions against Taiwan in 1994 because of its continued trade in rhino and tiger products. "These were the first U.S. trade sanctions based upon wildlife issues," says Hemley. The U.S. rewarded Taiwan's resulting enforcement improvements by dropping the sanctions in 1995. "Look what can be accomplished when the political will exists," affirms Hemley.

An "enterprise program" recently established near Chitwan by conservation groups and the Nepalese government has also yielded success. Among the program's components was the transfer of about 3,600 government acres of overgrazed park-side lands to locals, who allowed the land to regenerate after assuming ownership. Profiting from fees collected from tourists who enter these restored areas, climb a new wildlife observation tower, and purchase elephant-back safaris, park-side communities now maintain a direct financial interest in the well-being of wildlife. Additionally, rewards to informants have increased five-fold since 1991.

Proving that money talks, locals are now reporting poachers. Such cooperation has helped keep enterprise areas free of poaching throughout the last three years. In addition, rehabilitated lands have expanded wildlife habitat. So successful are enterprise programs that Dinerstein regards them as "the future of conservation in large parts of Asia."

Even so, zoo populations remain critically important to the survival of the greater one-horned Asian rhino, which is hardly out of the woods yet. With most wild members of this species still confined to two main areas, they remain vulnerable to catastrophes, such as poaching spells, epidemics, and floods. But the births of Chitwan and Himal have gone at least a little way toward guaranteeing the future of the greater one-horned Asian rhino.

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TO SAVE THE RHINOS

Largely because of hunting and land-use changes, rhinos have declined throughout human history. Today, five rhinoceros species survive: Africa is home to about 7,500 white rhinos and under 2,500 black rhinos; Asia is home to under 2,000 greater one-horned Asian rhinos, 400 to 500 Sumatran rhinos, and under 100 Javan rhinos—a species that may already be doomed by its small numbers. These rhino figures reflect a 90-percent decrease since 1970. Perhaps no other mammal family has been so rapidly reduced by human greed.

How can rhinos be saved? Many conservationists believe that keeping rhinos under heavy surveillance on game ranches is the most successful protection strategy at present. To this end, hundreds of African and Asian rhinos have been moved, at great expense, to reserves patrolled by armed guards. Among the better-dressed of such four-legged transplants will be ten rhinos soon to be moved to the Madikwe Game Reserve in South Africa. They will be fitted with special collars that, with satellite links, will support more continuous and longer-term tracking of animals than is afforded by conventional radio devices. If all goes as planned, these collars will "quickly convey information about poaching, without giving the perpetrators hours or days to escape," says Christie Feral, a program officer with the African Wildlife Foundation, which is funding the project.

Transplanting projects, such as the Madikwe effort, underscore a rhino irony: Generally, Asian rhinos are more habitat-limited than poaching-limited. By contrast, suitable habitat still abounds for African rhinos. But unprotected lands cannot be purged of poachers; rhinos become sitting ducks if they stray from small preserves that are rapidly filling to capacity.

One option to transplanting was dehorning—a desperate and controversial experiment involving the sedation of hundreds of rhinos and the sawing off of their horns in Namibia and Zimbabwe, starting in 1988, which proved ineffective. Poachers pursued even hornless rhinos, probably to harvest regenerating knobs. In addition, except for the greater one-horned Asian rhino, which protects itself with its teeth, not horns, rhinos need their horns for important activities, such as protecting their young and keeping away competitors. Because of such concerns, most dehorning projects ceased after 1994.

Nevertheless, the greater one-horned Asian rhino has already shown how fast rhinos can recoup, if given a chance. National Zoo Assistant Curator of Mammals John Lehnhardt emphasizes, for example, that the rhino population of Nepal's Royal Chitwan National Park—currently about 450 individuals strong, even after some animals were used to restock other areas—originated from only about 60 survivors that remained in 1960. This population multiplied surprisingly fast once aggressive anti-poaching and land protection measures were initiated.

—Lily Whiteman

For more information on greater one-horned Asian rhinos and efforts to protect their habitat, visit FONZ's Website at **http://www.fonz.org/**.