Executive Summary

Asian rhinoceros, pre-historic yet majestic looking creatures that have wallowed in swamps and wandered in forests for tens of millions of years, are among the world's most endangered species. They are on the brink of extinction in Vietnam and clinging precariously to survival in Indonesia and Malaysia. Fewer than 2,900 rhinos survive in the wild in all of Asia. Africa is home to around 2,700 black and 10,400 white rhinos in the wild.

Hundreds of species of rhinos once roamed the earth, but only three exist in Asia today. The most critically endangered rhino, the Sumatran, has declined from an estimated 600 animals in 1994 to around only 300 today. In less than a decade more than half the population of this species has been lost. By the mid-1900s, Sumatran rhinos were scattered, with small numbers located mainly in Sumatra, Indonesia, where they were estimated to number between 425 and 800 in the early 1980s, with lesser numbers in Peninsular Malaysia and in Borneo (Sabah, Sarawak and Kalimantan).

The Javan rhino, which inhabits the western tip of the Java Peninsula and the remotest part of Cat Tien National Park in Vietnam, is the rarest of the Asian rhino species. It numbers no more than 50 to 60 animals in Indonesia (*Rhinoceros sondaicus sondaicus*), and probably less than eight in Vietnam (*Rhinoceros sondaicus annamiticus*).

The Javan and Sumatran rhinos are classified as Critically Endangered in the IUCN (World Conservation Union) Red List of Threatened Species, while the greater Asian one-horned or Indian rhino (*Rhinoceros unicornis*) is listed as Endangered.

Although the greater Asian one-horned rhino is now the most numerous of the three Asian species, its future is still far from secure. All is not gloom, however, and there have been conservation success stories. Early in the last century only a dozen greater Asian one-horned rhinos survived in Kaziranga National Park in north-eastern India. Kaziranga was protected from 1908 and, despite considerable fluctuations in the early years, the population has grown to over 1,500 today. In Nepal, greater Asian one-horned rhinos were numerous in the swampy regions of the Terai (Sanskrit for "lowlands") near the Indian border, playing an important role in Nepalese culture and royal rites, as well as being a hunting trophy for the rulers and their guests. After World War II many rhinos were killed, leaving only around 100 rhinos in the Chitwan Valley in 1968, where a national park was established in 1973. Poaching was brought under control, and due to intensive conservation efforts and law enforcement, the rhinos have increased to over 600 now in the Chitwan Valley.

But there is no room for complacency as poachers continue to pursue the rhino in Asia,

Greater Asian one-horned rhino.

WWF-CANON/Y.J. REY-MILLET

often penetrating into remote, dense forest or inhospitable wetland habitat, to meet the demand elsewhere in Asia. Between July 1998 and August 2001, at least 34 rhinos were poached in the Chitwan Valley in Nepal. The rhinos were shot with firearms, speared, captured in concealed pits, poisoned or electrocuted by power lines deliberately lowered onto the regular paths of the rhinos and other wildlife. In India reports reveal an unusually high spate of poaching, resulting in the deaths of 35 rhinos between January 1998 and February 1999.

Although 40 Rhino Protection Units operate to safeguard the Sumatran rhino in Indonesia and Malaysia, twice that number is needed. There have been few reported deaths since 1995, but in April 2001 the carcass of a female rhino, believed to be more than 10 years old, was discovered in a forest reserve in Sabah, Malaysia, on the island of Borneo. That same month, grim news also emerged from Sumatra in Indonesia. A male rhino was found caught in a snare in Bukit Barisan Salatan National Park and died from a combination of dehydration and over-exertion as it tried to escape.

SOTHEBY'S

Sinceny faience table top, *c.* 1748-50 (private collection, London)

The poachers, paid by unscrupulous middlemen and traders, are mainly in pursuit of rhino horn and other body parts, used in traditional Asian medicine systems to treat a wide range of illnesses from reducing fevers and calming convulsions to stopping nosebleeds and preventing strokes. Traditional Asian medicine made from rhino horn is processed into tablets, herbal treatments and tonics and sold worldwide with the main users in China, Singapore, Malaysia, Taiwan, South Korea, Hong Kong and wherever ethnic Chinese communities live, including North America, Australia and Europe. Patented medicines that claim to contain rhino horn are also manufactured and traded internationally, further stimulating trade in authentic rhino horn and the poaching of rhinos to meet market demand.

WWF and TRAFFIC, the wildlife trade monitoring programme of WWF and IUCN, have been working to combat the illegal trade in rhino horn and other parts with its partners since the 1970s. All international trade in rhino horn and products is in violation of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). Across the globe WWF and TRAFFIC have launched joint public awareness campaigns and opened dialogue with the users and practitioners of traditional Asian medicine systems. WWF and TRAFFIC are also continuing to monitor the enforcement and effectiveness of the trade bans and are disseminating information regarding viable substitutes that do not threaten species of animals or plants.

In 1998, WWF strengthened its support for anti-poaching, monitoring and habitat protection when it launched its Asian Rhino and Elephant Action Strategy (AREAS) Programme to ensure that broad landscapes where Asian rhinos and elephants live, are given much-needed security.

WWF's AREAS Programme combines cutting-edge conservation biology with trade monitoring, socio-economic analysis, and policy advocacy. WWF envisions rebuilding and conserving rhino populations in Asia and ensuring the peaceful coexistence of people and wildlife. WWF's AREAS Programme reaches beyond national parks and reserves into surrounding areas and addresses land-use practices. The cornerstone of AREAS is landscape conservation, whose aim is to connect and safeguard networks of protected areas. Through sound land-use planning conserving vast areas, endangered species can migrate freely through forested corridors between reserves, some of which are too isolated or too small to maintain them.

The Asian rhino can only be saved from extinction if effective measures are taken to combat both the persistent demands of traditional Asian medicine and habitat loss. In the short term, rhino habitat needs to be safeguarded immediately against any further fragmentation and degradation. Expansion of oil palm, wood pulp, and coffee plantations into rhino habitat must be sharply curtailed and natural forest cover maintained. Anti-poaching efforts must be strengthened wherever rhinos survive. Government management authorities must allocate more resources for rhino conservation, clamp down on corruption, and improve management.

Development and conservation programmes must reconcile the interests of both people and rhinos. Effective substitutes, a number of which have been identified by the Asian medicinal community, must be promoted by practitioners of traditional Asian medicine systems. The link between illegal trade in rhino horn medicine and the disastrous effect it is having on the world's endangered rhinos must be emphasized through proactive publicity campaigns in consuming countries – with the ultimate aim of stopping trade in rhino horn.

Rhinos and People

When world-renowned artist Pablo Picasso emerged from a tour of the Lascaux caves in 1940 in France, he said of modern art: "We have discovered nothing". Were he alive today he could have marvelled over another treasure trove of cave art dating back some 30,000 years. This latest find, in the Dordogne region not far from Lascaux, has thrilled archaeologists and biologists alike.

In the autumn of 2000, inside an Ice Age cave near the small village of Cussac, an amateur cave explorer stumbled onto spectacular walls adorned with engravings of rhinoceros, mammoths, horses, deer and human beings. That same year in Leicestershire in the U.K. scientists uncovered the bones of a woolly rhinoceros. These recent discoveries in France and England could not only unlock secrets to life during the Ice Age but also reveal exciting information on the creatures' early widespread distribution.

The bones in Leicestershire suggest early man may have hunted in a land where animals such as the woolly rhinoceros, usually associated with colder climates, coexisted with spotted hyenas, found only in Africa today.

When Europeans colonized Asia and Africa in recent times, rhinos were still common throughout most of their traditional ranges. The greater one-horned rhino was found as far west as the Khyber Pass, linking the Indian subcontinent with Afghanistan, and along the floodplains at the foot of the Himalayas to Assam, 2,000 kms to the east.

The first London rhinoceros, anonymous engraving, *c.* 1684 (Glasgow University Library).

Javan and Sumatran rhinos ranged from eastern India through Southeast Asia to the islands after which they were named. In Asia, the Javan and the Sumatran rhino lived in the moist tropical rainforest. Although the Javan rhino might have had a preference for the lower altitudes in many places, both Javan and Sumatran rhinos were also found in hilly terrain. In Africa, the white and black rhinos shared the woodlands and savannahs south of the Sahara. Formerly, vast rhinoceros populations existed in large, undisturbed contiguous habitats.

Like other wildlife, rhinos were utilized historically by people for meat and particularly for their horns. Unlike the horns of cattle, goats, sheep, and antelopes, which grow from the skull and have bony cores, rhino horn is formed of agglutinated keratin, which grows from a corrugated mound of nasal bone. If knocked off or removed the horns grow again.

Although sometimes short-tempered and violent, rhinos can be tamed quickly, and, like elephants, they were deployed

in battle by Indian princes. A 2,000-year-old bronze wine vessel found near Xian in China is in the form of a saddled rhino, curiously enough with two horns resembling those of an African black rhino. So prized was the rhino that the first Emperor of China, Qin Shihuang, who reigned from 221 and 229 BCE, dispatched an army of 500,000 soldiers with orders to open up southeast trade routes for the purpose of acquiring rhinoceros horns and elephant tusks.

Many rulers in Asia, Africa and Europe protected themselves from poisoning by testing drinks in rhino horn cups, as chronicled by Ctesias, a Greek physician in the 4th Century BCE Persian Court. If the drink bubbled or the cup disintegrated, it was "proof" of poison. As early as 500 BCE in China it was popular for people to visit the palace of their prince to share wine and to "raise the rhinoceros horn cup with wishes for long life," according to art historian Jan Chapman. A number of these exquisitely carved, elaborate cups can be seen in museums today.

Chinese and Indian artists carved elaborate ceremonial cups and dishes from rhino horn, which were also used for sword handles, belt buckles and buttons. In Europe, rhino horn was turned into decorative tableware. Rhino skin, when well treated, can look like transparent amber. It was used for shields in India, and as armour on Chinese war boats to deflect arrows and spears. Rhinos appeared in the arenas of Ancient Rome and a single-horned rhino depicted standing in a swamp in a hunting mosaic in Sicily is probably an Indian rhino.

MIKE BALTZER/WWF + CAT TIEN N.P.

First photo ever taken of a Vietnamese rhino in Cat Tien National Park. This was taken by a camera-trap in 1999.

Rhino blood was used as a human tonic, and its urine hung in containers over doorways in Nepal as a charm against ghosts, evil spirits and disease. Urine was prized for traditional medicine in India, where, even today, zookeepers are known to collect it from their charges to supply practitioners.

Powder from rhino horn was widely used for medicine in Europe, and, in 1591, Pope Gregory XIV was administered powdered rhino horn in an effort to revive him on his deathbed. This horn, minus the tip, is now in the American Museum of Natural History.

Evolution of the rhino

The five species existing today – white (or square-lipped) and black (or hooked lip) rhinos in Africa, each with two horns, and Sumatran (hairy and two-horned), and the greater (Indian) one-horned and lesser one-horned, or Javan, rhinos in Asia – still have a prehistoric look with their great bulk, rugged features and their distinctive prominent horns. But their ancestor, who lived 50 million years ago in the Oligocene, looked more like a miniature horse and had a flat, hornless head. Through evolutionary processes it gave rise to many hornless species, including the giant *Paceratherium*, which was six metres high at the shoulder and may have weighed 25 tonnes, four times the weight of an African bull elephant. *Paceratherium* browsed on bushes and trees on the Mongolian plains.

The first traces of horned rhinos were found in North America, where they lived between 25 and 40 million years ago. In later periods, horned species were found in Eurasia, some with two horns placed side by side and others with single or multiple horns in a variety of shapes.

Fossils indicating the ancestry of the two single-horned rhinos known today in Asia were found in the Sivalik hills fringing the southern flank of the Himalayas. In historic times, the greater one-horned rhino lived near the Sivaliks. The Javan or lesser one-horned rhino was found in the mangrove forests of the Sundarbans region, southeast of Calcutta, but that was the extreme west of its range which was throughout Southeast Asia, including the islands of Sumatra and Java.

The Sumatran or Asian two-horned rhino is considered a relative of the prehistoric woolly rhinoceros, depicted by Stone Age people in cave paintings and engravings in Europe. Complete carcasses have been found in Siberian permafrost. Like the Javan rhino, it has survived virtually unchanged for a million years.

Relatives of the woolly rhinoceros are believed to have moved into Africa and evolved into the two present species. Africa's white rhinoceros is not actually white in colour: the name is probably a corruption of the Dutch "wijd" for "wide", which describes its lips. Weighing up to 3.5 tonnes, the white rhino is second only to the African bush elephant in the scale of land mammals. It is a grazer and lives in social groups. Africa's black (actually grey) rhinoceros has a prehensile upper lip, which serves like a miniature elephant trunk when the rhino browses on bushes and plants.

Natural History and Distribution

The greater Asian one-horned rhino

The greater Asian one-horned rhino (*Rhinoceros unicornis*) has a single black horn and a grey-brown hide with skin folds, giving it an armoured appearance. It is the largest of the three Asian rhinoceros and weighs about two tonnes. Greater Asian one-horned rhinos show no true territoriality, although breeding males occupy loose territorial ranges of 2 to 8km. Temporary associations of a few sub-adults or adult males sometimes form at wallows or on grazing grounds. The greater Asian one-horned rhino originally roamed mainly in alluvial plain grasslands, where the grass can grow up to 8 metres tall, but was also found in the adjacent swamps and forest and in the hills and forests during times of flooding. The range of this species has now become so restricted by human modification of its habitat that it often uses cultivated areas, pastures and modified woodlands. Its diet consists mainly of grass, but it also includes reeds, water plants, twigs, fruit, and cultivated crops.

Females are fully grown by 6.5 years, with males not becoming fully mature until approximately 10 years of age. Females are sexually mature at between 5 and 7 years and

WWF-CANON/MICHEL GUNTHER

The greater Asian one-horned rhinoceros survives in the borderlands of north and northeast India and Nepal.

gestation periods range from 462 to 491 days. The single offspring is active soon after birth, remaining with the mother until the birth of her next calf. There is an interval of about three years between calves.

Distribution

The species survives in a few populations situated in the borderlands of north and northeast India, and Nepal. Until around 1600, the greater Asian one-horned rhino lived in

suitable habitat in the big valleys and plains of the Indus, Ganges, and Brahmaputra rivers in the northern part of the Indian sub-continent from Pakistan to the eastern Indian state of Assam, and the southern parts of Bhutan and Nepal.

The Sumatran or hairy rhino

The Sumatran rhino (*Dicerorhinus sumatrensis*), the smallest and probably most critically endangered of all rhino species, can weigh as much as 1,000kg. It is dark grey-brown in colour, and is the only Asian rhino species with two horns. The front horn is generally under 25cm long, while the posterior horn is usually quite small and often not more than a hump. Calves are born with a dense covering of hair, which turns reddish brown in young adults and becomes sparse, bristly and black in older animals. The Sumatran rhino occurs in a variety of habitats, from sea-level swamps to montane forests, but tends to frequent the thickest forests. Although now mainly found at higher altitudes because the lowland forests have disappeared, the Sumatran rhino used to be widespread at lower elevations and has even been seen swimming in the sea to reach coastal islands. Its diet consists mainly of leaves and twigs of forest undergrowth and sapling trees and fallen fruits. Patches of secondary forest on landslides and riverbanks are favoured feeding areas where low-growing plants are more abundant than in the tall and dark primary forest.

NEW ENGLAND

FOEAD, YAHYA AND SUMADI/WWF & BTNUK

Photo of young Javan rhino male, taken by a photo camera trap in Ujung Kulon in Indonesia.

Sumatran rhinos occur at low densities in the wild, usually not more than one rhino per 10 square kilometres of suitable habitat. Much of the day is spent in ponds or wallows that are dug out or deepened by the animals themselves. Since Sumatran rhinos are solitary, even encounters between males and females are usually aggressive unless the female is in oestrus. Females accompany their calves for a year and a half. Both sexes become sexually mature at 7 to 8 years of age. Sumatran rhinos in the wild give birth to one calf at a time, at intervals of 4 to 5 years.

Distribution

The species is found in small populations scattered in Peninsular Malaysia, Sumatra (Indonesia), and Sabah in Borneo. The Sumatran rhino once roamed widely from the foothills of the Himalayas in Bhutan and eastern India, through Myanmar, Thailand, and south through the Malay Peninsula, to the islands of Sumatra and Borneo.

Javan or lesser one-horned rhinoceros

The Javan (or lesser one-horned) rhino (*Rhinoceros sondaicus*) is one of the rarest large mammal species in the world. It is a dusky grey colour and has a single horn. This species, similar in appearance to the closely related greater Asian one-horned rhino, is slightly smaller, with a much smaller head and less developed folds of skin on the neck. In Java, a large portion of the females are hornless, though horned females are known from other parts of the range. Except for mating pairs and mothers with young, the species is solitary. Javan rhinos favour dense rainforest with a good supply of water and plentiful mud wallows. They prefer low-lying areas, although some animals have been recorded above 1,000m. In former times, they were common on all the major volcanoes in the western half of Java, where they were seen at 3,000m above sea level. Their diet consists mainly of leaves, young shoots, twigs, and fallen fruit.

Very little is known about the breeding biology of the species as it has never bred in captivity. Being a forest species one may assume that its biology is similar in many aspects to that of the Sumatran rhino. There is probably no well-defined breeding season and the gestation period is assumed to be about 16 months, like other rhino species. The single offspring is active soon after birth, being suckled by the mother for at least one and a half years. Mature females are thought not to breed more often than every fourth or fifth year.

Distribution

This species survives only in Java, Indonesia (*Rhinoceros sondaicus sondaicus*) and Vietnam (*Rhinoceros sondaicus annamiticus*). It once roamed widely throughout its former range from the Sundarbans in India (*Rhinoceros sondaicus inermis*), throughout Southeast Asia and Indochina and in Indonesia on Sumatra and the western half of Java. Fossil remains, only a few thousand years old, have been found on the island of Borneo.

Asian rhinos at a glance – 2002

All five species of rhinoceros are threatened with extinction. The white rhino, with the exception of the Critically Endangered northern sub-species, is listed as 'conservation dependent', and the greater Asian one-horned or Indian rhino is listed as Endangered in IUCN's Red List of Threatened Species (Hilton-Taylor 2000). Black, Javan and Sumatran rhinos are considered Critically Endangered.

In the 1890s, conservationists feared the white rhino had disappeared from the planet. The discovery of a single surviving population of barely 20 animals in 1885 in Natal in South Africa was followed by intensive conservation efforts. These have resulted in a present-day African population of 10,400. The black rhino has not fared as well, although the dramatic decline that occurred in the 1970s and 1980s has been halted and the populations are slowly recovering. Today there are around 2,700 black rhinos remaining in the wild in Africa, compared to around 2,550 in 1993. In 1970 black rhinos may have numbered 65,000 in sub-Saharan Africa.

Current Status of Asian Rhinos 2002*

	Estimated Rhino Population		
Priority Landscapes	*Greater one-horned*	*Javan*	*Sumatran*
SOUTH ASIA			
Central Terai Arc (Nepal, India)	**-540**		
Western Terai Arc (Nepal, India)	**-70**		
Kaziranga-Karbi Anglong & Southern Brahmaputra Valley (India)	**-1,480**		
INDOCHINA			
Cat Tien (Vietnam)		**<10**	
SOUTHEAST ASIA			
Kinabatangan to Sebuku- Sembakung Landscape (Malaysia, Indonesia)			**-30 - 70**
Peninsular Malaysia & Southern Thailand			**-50**
Bukit Barisan Selatan, Sumatra Indonesia			**20 - 40**
Ujung Kulon, Java (Indonesia)		**50 - 60**	

* Source: Securing a Future for Asia's Wild Rhinos & Elephants. 2002, WWF, Washington D.C.

Asian one-horned rhinos stage a comeback

Two of the greatest conservation success stories of the 1900s were the comeback of the southern white rhino in Africa and the greater one-horned rhino in India and Nepal.

The greater Asian one-horned rhino is now the most numerous of the three Asian species. Early in the last century only a dozen greater Asian one-horned rhinos survived in Kaziranga National Park in northeastern **India**. Kaziranga was protected from 1908 and, despite considerable fluctuations in early years, the population grew to over 1,500 in 2000. In India, rhinos also survive in other reserves, notably Orang, Pabitora, and Jaldapara. However, poachers continue to kill considerable numbers of rhinos in all these reserves. Fortunately, over the years the recruitment through births has outpaced the losses, mainly in Kaziranga, through poaching, thanks to the rigorous protection provided by park guards. A small number of rhinos has been translocated to the Dudhwa Reserve in Uttar Pradesh to reestablish the rhino in central India.

IRF-KAZIRANGA/NICO VAN STRIEN

Greater Asian one-horned rhino in Kaziranga National Park in India.

In **Nepal**, greater Asian one-horned rhinos were numerous in the swampy regions of the Terai near the Indian border and played an important role in Nepalese culture and royal rites, as well as being a trophy for the rulers and their guests. The conquest of virulent strains of malaria in the Terai after World War II permitted settlement. Many rhinos were killed, leaving only 81 to 108 rhinos in the Chitwan Valley in 1968, where a national park was established in 1973. Poaching was brought under control, and due to intensive conservation efforts and enforcement under military guard the rhinos have increased to over 600 today.

Sumatran rhinos losing ground

The most critically endangered rhino, the Sumatran, has declined from an estimated 600 animals in 1994 to around 300 today. In less than a decade more than half the population has been lost. By the mid-1950s, Sumatran rhinos were scattered, with small numbers located mainly in Sumatra, **Indonesia**, where they were estimated to number between 425 and 800 in the early 1980s, with lesser numbers in Peninsular **Malaysia**, Sabah, Sarawak, and Kalimantan in Borneo. The broad range of figures recorded over the years reflects the difficulty of counting these discrete forest dwellers. The decline of the Sumatran rhino appears to have been slowed and the numbers appear to be stabilizing in most of the core areas.

Javan rhinos cling to survival

The Javan rhino is the rarest of the rhino species with around 50 to 60 animals surviving in Ujung Kulon National Park in **Indonesia**. The other population in Cat Tien National Park in **Vietnam** is most likely less than five to eight individuals.

WWF's Campaign for Rhino Conservation

In October 1961 the London Daily Mirror published a "Shock Issue" for the launch of the World Wildlife Fund (known outside North America today as the World Wide Fund for Nature). It featured a black rhino as an example of an animal requiring urgent action to save it from extinction, thereby establishing a theme that has run throughout WWF's conservation programmes to this day. Since WWF's founding over 40 years ago, the organization has been working with non-governmental and governmental partners around the globe to ensure the survival of this magnificent species.

In Asia, WWF support for government programmes in Nepal, India, Indonesia, and Malaysia has been very successful. Until the recent re-discovery of Javan rhinos in Vietnam, it was thought that the only surviving population of this once-widespread species was on the Ujung Kulon peninsula of western Java. The rhino population was estimated at between 21 and 28 in 1967 as the project got under way, with WWF providing equipment for the Indonesian authorities, and supporting the scientific collaboration of Professor Rudolf Schenkel and his wife, Dr Lotte Schenkel, of Switzerland. By 1976 the number of rhinos had risen to 45 – 54 and has since remained around 50.

Little was known of the status of the secretive two-horned Sumatran rhino. WWF funded investigations in Gunung Leuser Reserve, where Dr Fred Kurt estimated the population at 60 to 100 in 1970. Follow-up projects provided equipment and scientific assistance through research, and the Gunung Leuser rhinos are the best-studied population. Around 1980 there were 80 – 120 rhinos, but after the support for the anti-poaching patrols was stopped, the rhino poachers moved into the core rhino area and wiped out between 50 and 70 per cent of the rhinos in a few years. Now the rhinos are again protected by dedicated anti-poaching patrols, but it will take 15 to 20 years before the population can recover from the losses sustained in the late 1980s.

Sumatran rhinos were also found in the Malaysian state of Sabah in northeastern Borneo where WWF provided vehicles to help monitor rhino protection, assess habitat destruction, and funded ecological studies and preparation of a management plan. Surveys to establish rhino presence in peninsular Malaysia were funded, as was the training of specialists in rhino conservation.

Between 1961 and 1987, WWF supported some 40 rhino projects in Africa and around 44 projects in Asia. Six projects paid for trade monitoring. The main investment was in anti-poaching operations, translocation and protected areas. Funds were also provided for research into the rhino horn trade.

WWF support for rhino horn trade investigation

Early investigation of the international trade in rhino products was largely carried out by WWF and TRAFFIC, the wildlife trade monitoring programme of WWF and IUCN

(World Conservation Union). TRAFFIC was founded as a joint programme of WWF and IUCN in 1976. In 1977, the entire *Rhinocerotidae* family was listed on Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Appendix I listing prohibits international trade among CITES member nations. In 1978, WWF and IUCN commissioned Dr Esmond Martin, then an honorary consultant to the Species Survival Commission (SSC) African Rhino Specialist Group, to undertake a global review of the international trade in rhinoceros products. His alarming report, published by WWF and IUCN in 1980, revealed that the wholesale price of rhino horn in Asia had skyrocketed from US$33 a kilo (wholesale) in 1972 to US$2,400 (wholesale) in 1978. Dr Martin estimated annual world-wide trade was at a minimum of 7.75 tonnes per year, mainly from Africa. The upsurge in demand was coming from several parts of Asia, with the greatest pressure on the black rhino in Africa and the Sumatran rhino in Asia.

The study also helped to dispel the myth that the Chinese used rhino horn as an aphrodisiac, and establish that its main use was as a powerful fever-reducing drug. Thanks to the findings of Dr Martin's review, the first comprehensive account of its kind, WWF and IUCN bolstered its international fundraising efforts for its Save the Rhino Campaign. WWF stepped up support for TRAFFIC, whose 1980s research of the illegal trade in rhinoceros horn and products led to clampdowns on the trade in several countries. TRAFFIC's important information banks and databases helped the conservation community to analyse data, determine trade routes, and aid countries and territories in reducing trade and demand in rhino horn and other rhino body parts.

By the 1990s, two species of Asian rhinos (Javan and Sumatran), continued to teeter on the brink of extinction, as did the northern white rhino in Africa. In response to the rhino crises, TRAFFIC amplified its investigations and published an update of the world trade in rhino horn. The report concluded that due to the ongoing demand for rhino horn among traditional users of Chinese medicine, and despite an international trade ban on the whole rhino family and their products, "black rhinos held the dubious distinction of showing the fastest known rate of decline of any species of large mammal", according to Nigel Leader-Williams, author of the 1992 study. In the mid-1990s, IUCN's SSC Asian Rhino Specialist Group revealed that the Sumatran rhino population in Asia had been halved from around 600 to 300. TRAFFIC India also unveiled a shocking number of rhino deaths in one of the world's best protected areas, Kaziranga National Park. Between 1990 and 1993, poachers killed 147 greater one-horned rhinos; in all, 209 rhinos or 13.8 per cent of the country's remaining population were shot, poisoned or electrocuted.

WWF-CANON/JIM JABARA

Confiscated wildlife in Nepal including two rhino horns.

Threats and Issues

Illegal hunting for traditional Asian medicine

For thousands of years rhino horn has been used in traditional Asian medicine systems to treat a wide range of illnesses from reducing fevers and calming convulsions to stopping nosebleeds and preventing strokes. It is not prescribed as an aphrodisiac (as was widely rumoured until the early 1980s). Traditional Asian medicine made from rhino horn is processed into tablets, herbal treatments and tonics, and sold world-wide, with the main users in China, Singapore, Malaysia, Taiwan, South Korea, Hong Kong and wherever Chinese communities live including North America, Australia and Europe. Patented medicines that claim to contain rhino horn are also manufactured and traded internationally, further stimulating trade in authentic rhino horn and the poaching of rhinos to meet market demand. China (1993) and Taiwan (1985) banned the sale of rhino horn and other body parts in traditional medicine, but TRAFFIC investigations have recorded the continued and wide availability of rhino horn and tiger-bone-based-medicines. Taiwan required registration of privately held rhino horn stock in 1990, but as of September 1994 there were still no penalties for failure to register it. In August of 1994, 12 rhino horns, allegedly imported from Malaysia in March 1994, were seized by authorities in Taiwan.

WWF-CANON/SUSAN LIEBERMAN

Rhino horns confiscated or collected from rhinos that died from natural causes in Nepal.

Recognizing that law enforcement alone could not stem rhino horn and product use, or the poaching that feeds it, WWF and TRAFFIC began a dialogue with traditional medicine practitioners and other user groups to resolve the world-wide problem. For example, TRAFFIC and WWF research carried out in 1996 and 1997 disclosed that more medicines purported to contain rhino horn were more readily available in North America than in China.

Starting in the late 1990s, governments in 11 consuming countries and territories began working with their traditional medicine communities regarding the use of endangered species such as the rhinoceros in traditional medicines.

Weak law enforcement and middlemen

In Asia, poachers continue to pursue the rhino, hindered to some extent by the animals' scattered numbers, often in remote, dense forest or inaccessible wetland habitat. Alarming reports from the Chitwan Valley have revealed a dramatic increase in rhino deaths. In only five months, between November 2001 and March 2002, at least 15 rhinos were killed by poachers. Between July 1998 and August 2001, 34 rhinos were poached in the Chitwan Valley in Nepal, according to the area's anti-poaching team leader. The rhinos were shot with firearms, speared, captured in concealed pits, poisoned

or electrocuted by power lines deliberately lowered onto the regular paths of the rhinos and other wildlife. The Wildlife Protection Society (WPS) of India reports that in an unusually high spate of poaching, 35 rhinos were poached between January 1998 and February 1999. Despite numerous pending cases, to date only one conviction has ever been made for a case involving trade in rhino horn in India, according to the WPS.

Although 40 Rhino Protection Units operate to protect the Sumatran rhino in Indonesia and Malaysia, twice that number is needed. There have been few reported deaths since 1995, but in April 2001 the carcass of a female rhino, believed to be more than 10 years old, was discovered in a forest reserve in Sabah on the island of Borneo in Malaysia. Gun pellets were found in the carcass, and wildlife authorities pursued the offenders, who face a mandatory jail sentence of between six months and five years. That same month, grim news also emerged from Sumatra in Indonesia. A male rhino was found caught in a snare and died from over-exertion as it tried to escape. A member of a Rhino Protection Unit was shot at recently in Way Kambas National Park, as well-organized hunters become bolder in their pursuit of wildlife.

Habitat loss

Every landscape where the Asian rhino clings precariously to survival is suffering from the pressures of agricultural clearance, logging, encroachment by people in search of land, and commercial plantations for oil palm, wood pulp, coffee, rubber, cashew and cocoa. For example, in Indonesia, environmentally destructive oil palm plantations have grown from 100,000ha to 2.4 million ha between 1967 and 1997. Concessions of 5.5 million ha have already been granted, much of this in rhino habitat. In neighbouring Vietnam, over a quarter of a million people live in the buffer zone of Cat Tien National Park, an area heavily defoliated by Agent Orange during the US/Vietnam war. Unfortunately, this habitat, like so many others in Southeast Asia, is losing natural forest cover at an alarming rate.

Impact of catastrophes

In 1997, forest fires in Indonesia affected 5 million ha of land, 1 million of which was forest. According to WWF-Indonesia and the Economic and Environmental Programme for Southeast Asia, up to 80 per cent of the fires in Sumatra and Kalimantan were started by plantation owners, who use fire for clearing land. Formerly, logged-over land was left to

WWF-CANON/MARK EDWARDS

Villager in Sumatra, Indonesia observes damage caused by disastrous forest fires in 1997.

regenerate, but in recent times it has been converted to oil palm plantations. Such plantations prevent forest regeneration and radically reduce secondary growth needed by rhinos and other wildlife. The combination of logging, commercial plantations that use fire as a means to clear land (to destroy existing forest), and naturally occurring drought (compounded by climate change) are exacting a heavy toll on all biodiversity in the rhino's shrinking territory.

In 1998, some of the worst flooding in decades resulted in the deaths of around 39 rhinos in Kaziranga National Park in India. This tragedy underscores the fact that small isolated populations of rhinos are vulnerable to natural disasters such as drought, floods, fires and hurricanes. Formerly the rhinos could retreat to the higher ground fringing the floodplains, but these areas are now heavily populated and no longer provide a safe refuge during floods.

In Indonesia in late 1981 and early 1982 an unknown disease killed at least five rhinos in Indonesia's Ujung Kulon National Park, raising fears that an epidemic could wipe out a small rhino population, especially where inbreeding, due to small population size, has reduced genetic variability. Such an epidemic could be catastrophic for Vietnam's small remnant population of only five to eight Javan rhinos.

WWF-CANON/ELIZABETH KEMF

WWF is encouraging sustainable eco-tourism among villagers in the buffer zone of Ujung Kulon National Park in Indonesia.

Lack of institutional capacity and funds

In both Asia and Africa, rhinos have virtually been poached out of large expansive areas they used to roam. The majority of African rhinos are now in better protected and managed, smaller fenced sanctuaries, rhinos conservation areas, and unfenced Intensive Protection Zones. However, where there has been success, it has come at a very high cost. It has been calculated that expenditure on rhino conservation in both Africa and Asia has been as high as US$1000-1500 per square kilometre annually. The Rhino Protection Unit Programme in Indonesia funded by IRF, WWF and the U.S. Fish and Wildlife Service (USFWS), employs guards at a cost of over US$1,500 per rhino. With notable exceptions, the bulk of this expenditure has been funded by the governments or private sector management authorities. Maintaining sufficient and economically sustainable levels of expenditure is a major problem facing many rhino conservation departments.

In spite of poverty and development challenges, a number of governments in range countries have put resources and efforts into field conservation and anti-poaching. Indeed, sustainable ecotourism can both promote conservation and benefit local communities if revenues are securely in place to ensure shared profits. In many countries where rhinos still survive in the wild, government budgets for field conservation have simply been inadequate; the international community in general has only contributed relatively small amounts to offset these severe funding shortages. In both Asia and Africa, rhino populations currently suffering the biggest declines invariably occur in areas with lower field conservation expenditure, limited or no biological monitoring and management, and inadequate deployment of anti-poaching patrols and intelligence-gathering networks.

The genetic threat

In captivity, continued inbreeding is known to lead to genetic deterioration. Small populations of wild animals face the same risk. If a population drops below 100 breeding individuals, and stays at such low levels for a number of generations, as is the case with most surviving rhino populations, there can be a gradual loss of genetic variation. This can result in decreased immunity to diseases and reproductive problems. Random events, like floods, fires, disease or poaching may also lead to a reduction in the number of adult females or males. If loss of reproductive capacity follows, the rhino population will begin to shrink, and will continue to lose genetic variability until it becomes demographically unstable. By then, such a population is virtually doomed because it enters an "extinction vortex": small population size leads to increased inbreeding, leading to lower birth rates and decreased survival in a continuing cycle until the population dies out.

What WWF is doing for Asian rhinos

Combating illegal trade

Despite ongoing efforts by TRAFFIC, WWF, the International Rhino Foundation (IRF), other NGOs, and governments for the past few decades, the major immediate threat to all species of rhinos is still poaching for rhino horn. Rhinos face demand not only for their use in traditional Asian medicine but also for manufacturing of traditional dagger handles in Yemen. But the main market for rhino horn and products continues to be for medicinal use. Thus, WWF and TRAFFIC carry out public awareness campaigns and open dialogue with the users and practitioners of traditional Asian medicine systems. WWF and TRAFFIC are also continuing to monitor the enforcement and effectiveness of the trade bans and are disseminating information regarding viable substitutes that do not threaten species of animals or plants.

WWF strengthened its support for anti-poaching, habitat protection, with the launch of its Asian Rhino and Elephant Action Strategy (AREAS) Programme to ensure broad landscapes where rhinos live are given added protection. Highlights of WWF's achievements and TRAFFIC's work, supported entirely or in part by WWF, over the past decade are:

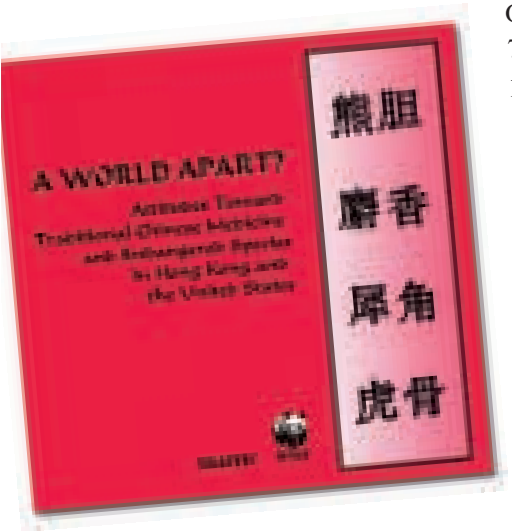
- TRAFFIC carried out a two-year survey on the availability of endangered species products in North America. The results, published in 1998 in the report, *While Supplies Last*, revealed that of 110 Traditional Chinese Medicine (TCM) shops in seven cities in **North America**, 49 per cent offered for sale one or more protected species medicines, some of which contained rhino horn.

WWF and TRAFFIC are working to halt the sale of products that contain or claim to contain rhino horn or other rhino parts.

WWF-CANON/ESMOND MARTIN

● In an effort to put an end to the gray market trade in endangered species products, many of which contained rhino and tiger derivatives, TRAFFIC North America and WWF worked with U.S. Congress and the U.S. Fish and Wildlife Service for nearly two years to help enact **the Rhino and Tiger Product Labelling Act**. This new legislation gives enforcement authorities the power to prohibit the sale of products containing or claiming to contain these ingredients, even if they do not contain them. The act, which became law in late 1998, amended the Rhinoceros and Tiger Conservation Act of 1994, which WWF was also instrumental in bringing into force.

● In July 1999, following a lead from TRAFFIC **Southeast Asia**, the Royal Forest Department of the Forest Protection Office Division of **Thailand** and CITES Division raided three TCM shops in the Chinatown district of Bangkok. One rhino horn weighing 70 grammes and 36 pieces of rhino skin weighing around 2.5kg were seized.



● TRAFFIC East/Southern Africa (TESA) established **a database on Rhino Horn and Product use in 54 countries**. In addition to documenting worldwide legal stocks, TESA also provides technical advice on how marking, registration and tracking systems can be improved in compliance with CITES directives.

● TRAFFIC Oceania hosted and coordinated a symposium with Environment **Australia** and the University of Western Sydney on **TCM and wildlife**. The first of its kind in the country, the symposium attracted a range of TCM practitioners and was covered in detail by the Pacific Journal of Oriental Medicine.

● TRAFFIC East Asia-Taipei started and now maintains a **Chinese-language web site** called Wildlife on the Web (WOW!), providing information on conservation issues, particularly those relating to trade. The site has sections devoted to CITES and traditional medicine.

● **Korean and Chinese newsletters** on traditional East Asian medicine and wildlife conservation were initiated and are published twice yearly with funding from WWF and the South Korean medicinal industry.

● **TRAFFIC India** began active support for the **Wildlife Institute of India** at Dehradun in the **development of forensic techniques** for identification of parts and derivatives of animals used in traditional medicines. The results are used extensively during awareness and training workshops organized for wildlife-law enforcement staff.

● TRAFFIC released in 1999, *A World Apart? Attitudes Toward Traditional Chinese Medicine and Endangered Species in* ***Hong Kong and the United States***, revealing for the first time how Chinese people on opposite sides of the Pacific Ocean view TCM.

● With funding from WWF, TRAFFIC East Asia works with the CITES Management Authority of the People's Republic of **China** to build the capacity of **wildlife-law enforcement** personnel in China to stop illegal trade in derivatives of endangered species. WWF has also held law enforcement training workshops in Japan and Taiwan.

● WWF, its long-term partner, the American College of Traditional Chinese Medicine (ACTCM), and TRAFFIC East Asia worked with others to organize *Healthy People, Healthy Planet – International* ***Conference on Traditional Chinese Medicine and Endangered Wildlife*** *Conservation*, in 1999 in Beijing.

● In 2000, TRAFFIC carried out **a survey in Japan of rhino horn stocks** in medicine shops. Twenty-one out of 100 medicinal shops surveyed stocked rhino horn products.

● In November 2001, WWF conducted an attitudinal survey to assess the awareness of endangered species used in TCM and awareness of existing laws and regulations prohibiting the use and sale of products containing or claiming to contain derivatives from endangered species among TCM practitioners, retailers, TCM college instructors and students in five major cities in the U.S. and in Canada.

● WWF and ACTCM are also in the process of launching a bilingual (English/Chinese) website to disseminate information on the plight of the endangered species used in TCM and promote available alternatives to TCM professionals. The website address is www.tcmwildlife.org.

● TRAFFIC East Asia completed an ***Attitude survey of South Korean traditional medicine practitioners.*** Rhino and four other species groups of conservation concern were the focus of the survey.

● Traffic East Asia is liasing with the CITES Secretariat, UNDP Pyongyang Office, and the **Democratic People's Republic of Korea's** National Coordinating Committee for Environment (NCCE) to encourage the DPR Korea to accede to CITES.

WWF's Asian Rhino and Elephant Action Strategy (AREAS)

WWF's Asian Rhino and Elephant Action Strategy (AREAS) is an ambitious programme that combines cutting edge conservation biology with trade monitoring, socio-economic analysis, and policy advocacy. AREAS promises new hope for dwindling populations of the few Asian pachyderm species, targeting 13 priority landscapes in South Asia, Indochina and Southeast Asia.

WWF envisions rebuilding and conserving rhino populations in Asia and ensuring the peaceful coexistence of people and wildlife. WWF's AREAS Programme reaches beyond national parks and reserves into surrounding areas and addresses land-use practices. The cornerstone of AREAS is landscape conservation, whose aim is to connect and safeguard networks of protected areas. Through conserving vast areas, endangered species can migrate freely through forested corridors between reserves, some of which are too small to maintain viable rhino populations, if left isolated. Recognizing that resources are limited, WWF and its partners are focusing on the following focal ecoregions and landscapes.

"On the ground, an elephant, rhino or tiger landscape, where flagship species often overlap, will usually equate to a series of well managed core protected areas (national parks, wildife sanctuaries, etc.), together with buffer zones, linked together by dedicated corridors of suitable habitat or by land-use that is elephant and rhino-friendly in its status and management".

WWF-CANON/MICHEL GUNTHER

Researchers tracking and patrolling rhinos in the Terai Arc Landscape on the Nepal-India border.

WWF's Asian Rhino and Elephant Action Strategy

In 1998, WWF developed the Asian Rhino and Elephant Action Strategy (AREAS), a comprehensive conservation framework targeting priority landscapes in South Asia, Indochina, and Southeast Asia. Within these key habitats, WWF and its partners work to:

- Restore and secure wilderness
- Strengthen antipoaching efforts
- Mitigate conflicts over resources to benefit both humans and elephants
- Facilitate creative land-use planning to solve problems facing wildlife and people
- Translocate rhinos to strengthen existing populations and establish new ones
- Monitor populations to improve management strategies for Asian elephants and rhinos

WWF's GLOBAL 200 Ecoregions

To help make strategic conservation decisions, WWF has developed the **Global 200®** – a science-based global ranking of the Earth's most biologically outstanding terrestrial, freshwater, and marine habitats. These are areas where the Earth's biological wealth is most distinctive or richest, where its loss will be more severely felt, and where we must fight the hardest for conservation.

Developed by WWF scientists in collaboration with regional experts around the world, the **Global 200** is the first comparative analysis of biodiversity to cover every major habitat type, spanning six continents and all the world's oceans. The ranking provides a critical blueprint for biodiversity conservation on a global scale.

By saving the **Global 200**, we can conserve the broadest variety of the world's habitat and species as well as the ecological and evolutionary processes that maintain life on Earth.

Javan – the rarest Asian rhinoceros

Ecoregion: Annamite Range Moist Forests
Country: Vietnam

WWF's AREAS Programme aims to conserve as much diversity as possible in elephant and rhino populations, together with their adaptations to different habitat types. The conservation challenges are daunting. For example, in the face of human population pressures, WWF is trying to secure a future for Vietnam's last rhinos in the remnants of forest that once covered much of the country. In order to protect their rhinos, the government established the Cat Loc Rhinoceros Reserve. The reserve covers approximately 30,000ha, but the rhinos occupy only 4,000ha. Since 1990 the rhinos have lost 85 per cent of their habitat. In 1999, the rhino reserve was integrated into Cat Tien National Park, which now measures around 75,000ha. The administrative connection of Cat Loc with Cat Tien is an important foundation for long-term success, but the corridor between the two areas is heavily utilised farmland, preventing the rhinos from moving to the larger Cat Tien area. WWF is working closely with Vietnamese authorities to protect the rhinos and restore their habitat, and to develop alternative sources of income for the rapidly increasing human population of this region.

NICO VAN STRIEN/ASIAN RHINO SPECIALIST GROUP

Javan Rhino *(Rhinoceros sondaicus sondaicus)*, Vietnamese Rhino *(Rhinoceros s. annamiticus)*.

WWF-CANON/ELIZABETH KEMF

Over 9,000 people live in Vietnam's Cat Tien National Park and around 250,000 people live in the buffer zone. This S'Tieng woman is a long-term resident of the area.

WWF, in partnership with Vietnamese authorities, has created five guard posts and increased the number of rangers to 35. WWF supports these teams with training, equipment, transport, and field allowances.

In 1998 and 1999 two rhino censuses were conducted in collaboration with the Institute of Ecology and Biological Resources (IEBR) in Hanoi, providing the largest data set on Cat Tien's rhinos ever collected. In 1999, WWF started a long-term photo-trapping exercise in order to learn about the sex and age structure of the population. That same year the first (camera trap) photos ever taken of a Javan rhino in Vietnam were released to the world.

GIS and remote sensing techniques are being used to assess overall habitat quality and levels of encroachment. WWF is also designing experimental plots to speed up regeneration of rhino food plants. Vietnam has, with technical advice from the IUCN/SSC Asian Rhino Specialist Group, WWF, and IEBR, developed an action plan for the preservation of the Javan (or Vietnamese) rhino in Cat Tien.

Ujung Kulon

Ecoregion: Banda-Flores Sea
Country: Indonesia

In October of 2001, camera trap photos and DNA analysis confirmed the birth of at least four rhinos in Ujung Kulon National Park in Indonesia, the last shelter for these critically endangered rhinos. The calves, born in 2000 and 2001, offered hope for the survival of what is probably the last viable population of Javan rhinos in the world. Rangers in Ujung Kulon patrol around the clock to ensure the safety of the animals. The guards' main support is provided by WWF, the International Rhino Foundation (IRF), and the government of Indonesia, through the Indonesian Rhino Conservation Program (IRCP). Ujung Kulon, a World Heritage Site, is located only 260km from Jakarta and covers 78,619ha of land and 44,337ha of marine territory. The core of the park harbours between 50 to 60 rhinos in about 40,000ha and a rich variety of other species, including the Javan gibbon.

WWF-CANON/ELIZABETH KEMF

WWF's camera-trapping leader in Ujung Kulon National Park, Yahya, sets up equipment in remote Javan rhino habitat.

The new births were confirmed through an 18-month survey carried out by WWF and the national park authority in Ujung Kulon. The survey used camera traps set deep in rhinoceros habitat, DNA analysis of droppings, and tracking to determine the number of animals living in the park. In January 2000, WWF Indonesia and Ujung Kulon Park authorities, with the support of the American Association of Zoo Keepers, started the camera trapping survey by setting up 10 cameras.

The births are a significant step and indicate that the rhinos are breeding with potential for further gains in population, according to WWF Indonesia. The aim of WWF and the park authority is to increase the park's possible carrying capacity to about 80 rhinos, through intensive protection and improvement of the quality of the habitat. Once this is achieved, it will allow for the translocation of other animals to form a founding group for a second Javan rhino population in Indonesia, permitting a secure location.

WWF is helping village communities around the Ujung Kulon National Park, 33 per cent of whom are farm labourers, to improve their livelihoods without jeopardizing conservation of the rhinos. This includes supporting micro-credit programmes for women and farmers' groups, setting aside zones from which seaweed can be put to traditional use, and promoting locally based ecotourism cooperatives and agroforestry measures. The park's Rhino Monitoring and Protection Units, which not only protect the rhinos, but also assist with surveys and monitoring, are made up of park rangers and local people, as part of an effort to boost community participation in conservation.

WWF-CANON/ELIZABETH KEMF

Rhino Care – woodcarving

Villagers in the buffer zone of Ujung Kulon National Park have developed, with WWF assistance, a sustainable and promising woodcarving industry. The carvings are crafted mainly from discarded wood collected from state-owned forest plantations. For nearly a decade WWF-Indonesia has supported this community-based conservation project in cooperation with WWF Sweden and the Swedish International Development Agency. A community cooperative has been established and a number of villagers are engaged in this conservation-based money making enterprise. Members of the cooperative also host visitors to the park in home stay guest houses, and guide tourists and scientists through the park's terrestrial and marine areas.

Sumatran – the most critically endangered rhinoceros

Ecoregions: Sumatran Island Lowland and Montane Forests, Sundaland Rivers and Swamps
Countries: Indonesia and Malaysia

On the island of Sumatra in Indonesia, the Sumatran rhino is under grave threat from poaching and habitat loss. In southern Sumatra, the known populations of rhinos are now confined to three protected areas: Bukit Barisan Selatan (BBS), Kerinci Seblat and Way Kambas. WWF is cooperating with other NGOs working in Kerinci and Way Kambas, but focusing its work in the southern half of the BBS, an area estimated to harbour 28-40 Sumatran rhinos. It is believed that the park is capable of supporting about 60 animals. The southern half of the park is around 200,000ha in size. However, parts of the area have been converted to agricultural settlement and plantations. Six anti-poaching units, called Rhino Protection Units (RPUs), are operated in BBS by the Indonesian Rhino Conservation Programme with support from WWF, the IRF and the USFWS. In 2000 and 2001, the BBS units recorded the highest number of offences of all parks where rhinos occur in Sumatra, with six attempts to poach rhinos, one of which resulted in a rhino death. BBS units also had the highest number of direct rhino sightings (four), and recorded 352 rhino tracks.

NICO VAN STRIEN/ASIAN RHINO SPECIALIST GROUP

Sumatran Rhino *(Dicerorhinus sumatrensis)*.

IRF/IRCP/NICO VAN STRIEN

Members of a Rhino Protection Unit set off for patrolling in Sumatra's Bukit Barisan Selatan National Park in Indonesia.

Recognizing that rhino habitat in BBS is being lost to illegal logging and conversion to coffee plantations, WWF is developing a strategy to help sustain a larger, viable population of rhino, based on the landscape approach. Thus, WWF, with local agencies, is developing a long-term strategy for the rhino in southern Sumatra which should (1) secure the habitat nearby and within the protected areas; (2) identify additional conservation areas such as logged concessions that can be reclaimed; (3) prescribe suitable buffer zone management that includes rhino-friendly agroforestry and alternative income generation methods for the local communities that are linked to conservation; (4) ensure conservation needs are incorporated into provincial land-use planning.

In 2001, WWF and its partners convened its first stakeholder workshop with local people and government officials on clarification and advocacy of boundary demarcation. In addition, preliminary socio-economic assessments were conducted, and data was collected on forest encroachment, rhino distribution, topography, forest degradation, poaching, and illegal logging.

"Heart of Borneo"

Ecoregions: Borneo Lowland and Montane Forests and Sundaland Rivers and Swamps
Countries: Malaysia and Indonesia

Another priority for WWF's AREAS Programme lies about 1,500km east of Peninsular Malaysia, across the South China Sea in Borneo, and comprises Malaysia's central-eastern Sabah and Indonesia's north-eastern Kalimantan. A population of only 30 to 70 Sumatran rhinos (and elephants and orang utans) dispersed in small pockets may roam the vast expanse of forests in Sabah, while the continued existence of rhinos in Kalimantan still needs to be demonstrated. WWF is trying to work with the government and industry to curb oil palm plantations and land-conversion and clearing practices to create a managed elephant/rhino range within the large expanse of prime elephant and rhino habitat in Sabah's and north-eastern Kalimantan's secondary forest.

WWF's AREAS Programme in the "Heart of Borneo", which began early in 2000, encompasses some 2.5 million ha of species-rich forest and wetlands where scattered populations of Sumatran rhinos struggle for survival. The Bornean form of the Sumatran rhino, (*Dicerorhinus sumatrensis harrissoni*), has suffered a serious decline in distribution and numbers throughout northern Borneo since destructive conversion of forest into oil palm plantations expanded in the 1980s. The creation of access roads deep into the forest home of the rhino led to an influx of poachers who target rhinos, especially in the Tabin Wildlife Reserve and several areas adjacent to the Danum Valley Forest Reserve.

WWF and its collaborators are also promoting the establishment of a new national park in Kalimantan and increased protection in the Danum Valley Forest Reserve, the Maliau Basin Forest Reserve, and the Kinabatangan Wildlife Sanctuary. After years of effort, the conservationists welcomed the official gazetting of Kinabatangan Wildlife Sanctuary in January 2002.

Since 2000, WWF has stepped up its efforts and is working together with local government authorities and non-governmental organizations (NGO), including SOS Rhino to help the dwindling number of rhinos to recover. Quick action was taken by WWF and its partners to follow up on rhino sightings by oil palm plantation workers in the Lower Kinabatangan River Region. The presence of three rhinos was confirmed in mid-2001 and camera trapping in the area is being set up. WWF is trying to aid the government in identifying core rhino conservation areas and supporting urgent measures to secure them.

So far, several activities have been organized: (1) socio-economic and elephant conflict survey in the Lower Kinabatangan Region (LKR), involving local residents and oil palm developers, (2) elephant and rhino survey seminar/training, (3) elephant and rhino surveys in Gunung Rara, (4) habitat classification in LKR, (5) rhino surveys in Kinabatangan.

WWF is helping develop a Geographic Information System (GIS) and database system for Sabah and northeast Kalimantan, continuing to gather data on rhino/elephant distribution (and other species, including orang utan), and identifying additional key forest corridors between protected areas and forest reserves in Sabah and Kalimantan.

WWF-CANON/ALAIN COMPOST

Sumatran rhinos in Indonesia and Malaysia are "critically endangered", threatened in part by poaching and oil palm plantation encroachment into their habitat.

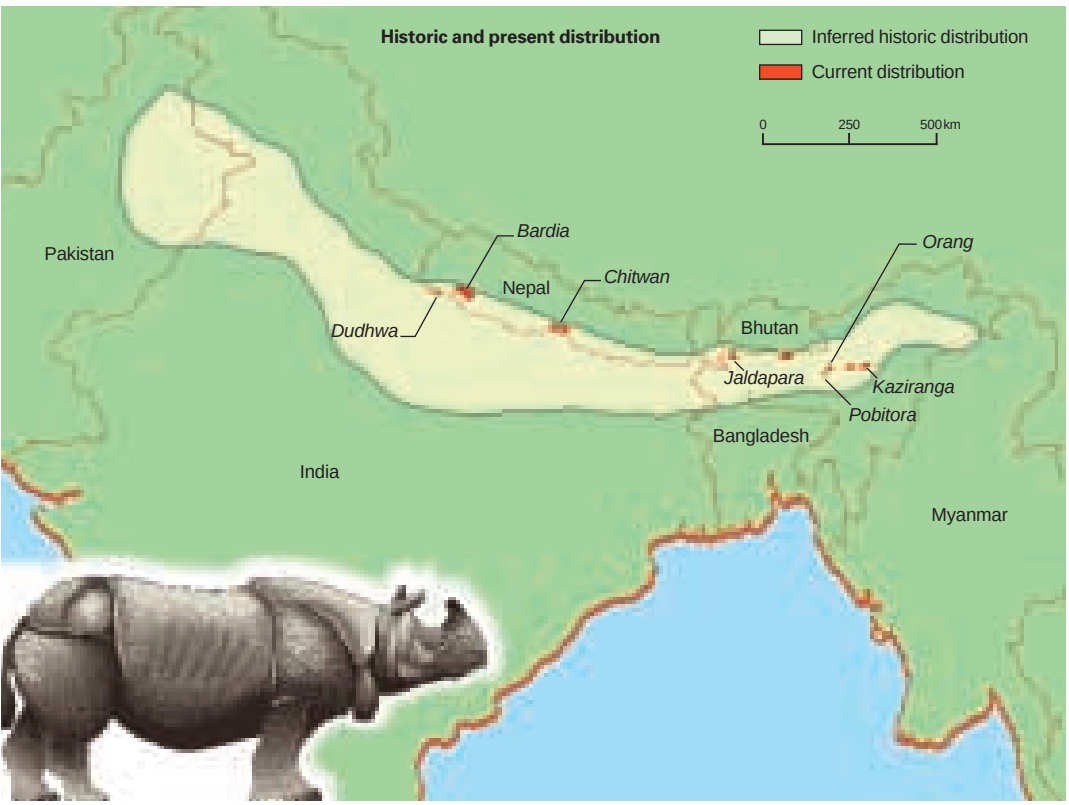
Greater one horned – the most successful Asian rhino

Ecoregions: Terai-Duar Savannahs and Grasslands and Naga-Manapuri Chin Hills Moist Forests
Countries: Nepal and India

The Terai Arc Landscape, stretching across some 5 million ha on the Nepali-India border, contains the second largest population of greater one-horned rhinoceros in the world. Encompassed in this biologically-rich expanse of tall grasslands and sal forests are four of Nepal's protected areas, the Royal Shuklapantha Wildlife Reserve, the Royal Bardia National Park, the Royal Chitwan National Park, and the Parsa Wildlife Reserve, and seven protected areas in India (see box on page 21). The dense Terai (Sanskrit for "lowlands") forests are one of the few places left in the world where the tiger, greater one-horned rhino, and Asian elephant co-exist.

The main goals of WWF's Terai Arc Landscape Programme are to preserve habitat integrity and to increase the land base that supports viable populations of large mammals and other species including the sarus crane, great hornbill, Gangetic River dolphin, and sloth bear. Ultimately, WWF and its partners would like to see the entire complex managed as a single unit by linking various protected areas with forested corridors.

Approximately three million people, half of whom subsist below the poverty line, live in this landscape and depend on its resources for their livelihood. Thus, WWF and its partners' strategy involves community forestry, park-revenue sharing, and awareness-building.



NICO VAN STRIEN/ASIAN RHINO SPECIALIST GROUP

Greater Asian One-Horned Rhino *(Rhinoceros unicornis).*

Working with its partners, WWF initiated work in the Terai Arc in the hope of connecting Bardia and Shuklapantha with India's Katarniaghat Wildlife Sanctuary and Dudhwa National Park. In Nepal's Royal Chitwan National Park, where WWF has been cooperating for decades with local NGOs and the government of Nepal, rhinos have increased five-fold since 1960. Chitwan now has the world's second largest population of greater one-horned rhinos, after Kaziranga National Park's 1500+ in India. Today, Nepal has more than 600 rhinos.

Between 1986 and 2002, WWF assisted the Nepalese government in translocating 72 rhinos from Chitwan to Bardia. The translocation is helping establish a new viable breeding population in Bardia and a third population in Shuklapantha. This should help minimize the growing number of human/rhino conflicts in and around Chitwan. The rhino translocation programme is a joint initiative of the Department of National Parks and Wildlife Conservation and the King Mahendra Trust for Nature Conservation with the financial support of WWF and the U.S. Fish and Wildlife Service.

One of the major achievements for WWF Nepal in 2001 was the co-signing of a Supplementary Agreement with the government Ministry of Forests and Soil Conservation. The five-year agreement specifies cooperation for the conservation of species and forests, and for sustainable development and landscape level planning, particularly in the Terai Arc

WWF-CANON/MICHEL GUNTHER

This rhino was translocated successfully in March 2002 in Nepal from Royal Chitwan National Park to Royal Bardia National Park.

Landscape. One component of the programme is to connect the protected areas from Nepal's Parsa Wildlife Reserve and Royal Chitwan National Park to India's Rajaji-Corbett National Parks in the west. This plan straddles an area of 49,500 sq. km. If this dream is realized, it would bring about transboundary cooperation between Nepal and India for maintaining linkages and corridors between parks. WWF's Programme Office in Nepal and WWF-India have signed a Memorandum of Understanding to help foster cooperation between governments to increase support for the Terai Arc Landscape.

Some of the key activities undertaken so far have been:

- Rhino, tiger and elephant conservation and monitoring
- Camera-trapping and evaluation of data
- Anti-poaching units and monitoring
- Research on forests, biodiversity, socio-economic conditions and legislation
- Development of a Conservation Plan including dedicated forest corridors
- Conservation Awareness Programmes
- Community Forestry and Natural Forest Regeneration
- Alternative Energy Programmes: biogas, solar, improved cook stoves
- Income Generation and Community Services
- Participatory Forest Workshops and Conservation Training
- Biodiversity Conservation Workshop for Local Leaders
- Nursery Establishment and Seedling Production

Protected Areas Included Within the Terai Arc Landscape:

Parsa Wildlife Reserve, Nepal

Royal Chitwan National Park, Nepal

Valmikinagar Wildlife Sanctuary, India

Sohelwa Wildlife Sanctuary, India

Royal Bardia National Park, Nepal

Katarniaghat Wildlife Sanctuary, India

Dudhwa National Park, India

Kishanpur Wildlife Sanctuary, India

Royal Shuklaphanta Wildlife Reserve, Nepal

Corbett National Park, India

Rajaji National Park, India

What Needs to be Done

The Asian rhino can only be saved from extinction if effective measures are taken to combat the primary and immediate threats to its survival: the persistent demands of traditional Asian medicine and habitat loss. The illegal trade in rhino horn must also be stopped at the national and international level and we must implement actions for the protection and conservation of all five species.

In the short term, rhino habitat needs to be safeguarded immediately against any further fragmentation and degradation. Expansion of oil palm, wood pulp, and coffee plantations into rhino habitat must be sharply curtailed and natural forest cover maintained. Anti-poaching efforts must be strengthened wherever rhinos survive. Government management authorities must allocate more resources for rhino conservation, clamp down on corruption, and improve management. In the past decade we have seen increased exchange of technical expertise between range states in Asia, but transboundary collaboration and protection needs to be established as part of the broad landscape approach, as outlined by WWF's Asian Rhino and Elephant Action Strategy Programme.

Development and conservation programmes must reconcile the interests of both people and rhinos. This includes people living in or near rhino reserves as well as the people who have used rhino parts for centuries. Effective substitutes, a number of which have been identified by the Asian medicinal community, must be promoted by practitioners of tradi-

WWF-CANON/MICHEL GUNTHER

Protection of rhinos and their habitat must be stepped up everywhere. These trackers are patrolling in Nepal's Royal Chitwan National Park.

WWF/INA BECKER

Public awareness programmes near Vietnam's Cat Tien National Park have reached out to thousands of teachers and students.

tional Asian medicine systems. Additional substitutes must be identified and used.

Culturally sensitive public awareness campaigns and environmental education activities – drawing upon the knowledge and involving the cooperation of traditional Oriental medicine practitioners – have been developed and implemented by WWF, other NGOs and governments. These campaigns must be expanded with continued recognition of health attitudes and traditions that date back thousands of years. The link between illegal trade in rhino horn medicine and the disastrous effect it is having on the world's endangered rhinos must be emphasized through proactive publicity campaigns in consuming countries – with the ultimate aim of stopping trade in rhino horn.

According to WWF's Asian Rhino and Elephant Action Strategy and IUCN's Asian Rhino Specialist Group, the following immediate measures must be taken in Asian range states:

- Development of additional core sanctuaries for Sumatran rhinos
- Halting ongoing forest loss in Sumatra
- Establishment of more anti-poaching units in Indonesia and Malaysia
- Establishment of a second sanctuary for Javan rhino in Indonesia
- Expansion of Vietnam's Javan rhino sanctuary
- Habitat improvement and extension for greater one-horned rhino in Kaziranga, India
- Rhino metapopulation management in India
- Infrastructure support for greater one-horned rhino conservation in India and Nepal
- Surveys of rhino habitat in Kalimantan, Indonesia
- Intensive protection for all rhinos in Sumatra, Java, Peninsular Malaysia and Sabah
- Increased rhino trade studies
- Improved intelligence gathering and informant networks
- Improved law enforcement and judicial practices

The main goal of WWF's Asian Rhino and Elephant Action Strategy (AREAS) is for the three species of Asian rhinos and the Asian elephant to thrive in secure habitats within their historical range, in harmony with people. AREAS is working with local partners and governments and other NGOs to meet a number of selected key targets in WWF focal landscapes including:

Terai Arc: A trans-border landscape that supports two populations of 100+ rhinos, and adequate habitat for 1000+ elephants established by 2010.

At least four corridors for elephant/rhino movement restored and secured by 2010.

Borneo: A contiguous, (Managed Elephant Range) multiple-use forest landscape, from the Upper Sebuku-Sembakung to the Lower Kinabatangan watersheds, is secured for viable populations of elephant, rhino, and orang utan by 2010.

Poaching of rhino and other wildlife stopped.

WWF-CANON/ELIZABETH KEMF

This weaver leads a women's cooperative in the buffer zone of Cat Tien National Park where WWF is promoting sustainable income generating activities.

Ujung Kulon: At least a 20 per cent increase of Javan rhinos in Ujung Kulon in Indonesia by 2010.

"Zero poaching" status for rhinos maintained.

Negative impacts of ecotourism on rhinos and habitat minimized.

Cat Tien: By 2003, and thereafter, the rhino population in Cat Tien is secure from disturbance.

By 2005 secure rhino habitat in Cat Tien is expanded from 4,000ha to 15,000ha.

Bukit Barisan Selatan (Indonesia): No Sumatran rhinos are poached from 2005.

Accurate population census/trend determined by 2010.

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WWF-CANON/MICHEL GUNTHER

A greater Asian one horned rhino is observed by tourists in Nepal, where 50 per cent of protected area revenues are shared with communities living in the buffer zones.