

Status Survey and Conservation Action Plan

# African Rhino

Compiled by  
Richard Emslie and Martin Brooks



IUCN/SSC African Rhino Specialist Group

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SPECIES SURVIVAL COMMISSION



Sultanate of Oman



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**The Rhinoceros and Tiger Conservation Fund (RTCF)** is a small grant fund managed by the FWS to strengthen habitat and ecosystem management, create protected areas, and develop local capacity to support rhino and tiger conservation initiatives. The RTCF liaises closely with the AfRSG and other conservation entities to ensure the best use of limited resources for rhino conservation. Fifty-six grants (totalling \$970,000) have been awarded in 12 countries from the available 1996, 1997, and 1998 appropriated funding. These appropriated funds generated \$1,748,616 in matching funds and in-kind contributions.

**The International Rhino Foundation (IRF)** is an organization whose mission is to support (financially, technically, administratively) and operate rhino conservation and research programs, both in nature and in captivity, with particular emphasis on intensive management and protection. IRF has provided financial support for the IUCN/SSC African Rhino Specialist Group (AfRSG) as well as program office services and other funds to the Asian Rhino Specialist Group (AsRSG). Currently, IRF is the largest and therefore leading NGO in the program to conserve the northern white rhino in Garamba National Park. IRF supports other conservation programs for both black and white rhinoceros.

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# Foreword

The black and the white rhinoceros are two of the most charismatic megaherbivores left on our planet and have become flagship species for international conservation. They are significant not only for the continuation of a major evolutionary heritage but also as symbols for the protection of African savannahs.

Africa's two rhinoceros species have a chequered history and the battle for their survival has been marked by some notable successes and sadly, many failures. The crash in black rhino numbers in Africa by more than 96% in just 30 years is one of the most rapid declines of any large mammal. Fortunately, some range states have bucked this trend with numbers increasing steadily over the past two decades. Only about 10 western black rhino (*Diceros bicornis longipes*) and 25 northern white rhino (*Ceratotherium simum cottoni*) survive, while numbers of southern white rhino (*Ceratotherium simum simum*) have increased from only about 20 a century ago to over 9,200 worldwide today.

This Actions Plan's identification of *key* and *important* populations, the development of a system to bring limited resources to critical projects, and the highlighting of successful conservation approaches represent a major contribution to efforts to conserve the six subspecies of African rhinoceros.

In particular, this Plan highlights the need to concentrate efforts to ensure that, at the very least, the *key* populations of the six subspecies are protected. We must strive to ensure that as many rhino populations as possible are protected in sanctuaries, conservancies, rhino

conservation areas, and intensive protection zones where law enforcement effort and sound biological management can be concentrated. Intelligence networks are proving to be cost-effective tools in winning the battle against illegal hunting and trade in rhino horn.

Successful rhino conservation comes at a high price and government grants for conservation are declining across the African continent. The challenge facing conservation organisations in Africa is to become self-sufficient by developing strategies where revenue raised from the sustainable use of rhinos can be used to offset their high conservation cost. Successful conservation of Africa's wildlife cannot be separated from the lives of its peoples. The more local communities benefit from the protection of rhinos, the more secure will be the future of these magnificent animals. We must continually assess the performance of the varied conservation actions used across the range states and modify them as necessary to ensure that precious resources are not wasted.

I call upon all donors, governments, non-government organisations, conservation departments and private benefactors sustaining both field and captive conservation efforts, to mobilise unprecedented levels of support. Only then can we fully implement the essential strategies and approaches outlined in this Plan and ensure the survival of Africa's wild rhinos.

Simon N. Stuart  
Head of IUCN SSC programme

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# Executive Summary

The two species of African rhinoceros, the black rhino (*Diceros bicornis*) and the white rhino (*Ceratotherium simum*) have been driven to near extinction in recent years. Their futures now depend on the development and operation of effective conservation strategies at local, national, and regional levels.

This Plan is aimed at donors, government and non-government organisations, and all those involved in rhino conservation. It outlines the actions and strategies needed to catalyse support for these majestic animals, and help secure their future in sub-Saharan Africa.

## The black rhino

The black rhino is classified as Critically Endangered in the IUCN 1996 *Red List of Threatened Animals*. Yet as recently as the 1960s, it was estimated that over 100,000 black rhino were still roaming Africa. Poaching, combined with inadequate field protection has decimated these populations. Of the four black rhino subspecies, the future of the western black rhino is especially bleak, with about 10 animals scattered across northern Cameroon. The south-central black rhino is the most numerous, yet has an estimated population of only 1,360. Some populations have increased well under protection and others appear to have stabilised during the 1990s. The most recent estimate of 2,600 African black rhinos in 1997 indicates that, for the first time since the compilation of continental statistics began, black rhino numbers in the wild are showing a slight increase. There are 235 black rhino in captivity.

## The white rhino

The southern white rhino, rescued from near extinction a century ago, stands as one of the world's greatest conservation success stories. From a single population of barely 20 animals in 1885, there are now more than 8,440 in 247 wild populations, with an additional 704 animals in captive breeding institutions world-wide. Numbers continue to increase in the wild, and the white rhino is now classified as Lower Risk – Conservation Dependent.

By contrast, the situation facing the future of the northern white rhino is critical. In 1960, there were an estimated 2,250 animals; today, only 25 animals are known to exist in the wild in a single population. There are nine ageing and non-breeding animals in two zoos and the subspecies is classified as Critically Endangered.

## Continuing threats to rhino survival

The situation facing African rhinoceroses is still critical. The international horn trade ban and the domestic bans imposed in most traditional user states, have driven the trade further 'underground,' in some cases inflating prices and making illegal dealing even more lucrative. The demand for horn from Asia (for traditional medicines) and from the Middle East (for dagger handles) persists and the threat of a return to large-scale poaching is ever present. Wars, civil unrest, poverty, influxes of refugees, and internal corruption within many range states combine so that poachers usually escape arrest and poverty-stricken people become poachers to survive.

Given the political will, stability and adequate field expenditure, rhinos can be conserved in the wild. As conservation budgets continue to decline, the greatest challenge for the future of the rhinos is maintaining sufficient conservation expenditure by range states. Unless income increases from donors and other sources, or costs are reduced without affecting effectiveness, conservation programmes will be jeopardised.

## Goals for rhino conservationists over the next decade:

- Wildlife departments and conservation agencies developing rhino conservation strategies that can lead to self-sufficiency.
- Conservation effort directed towards existing and potential *key* and *important* rhino populations, including the most threatened African rhino subspecies.
- Increased regional cooperation in subspecies meta-population management, conservation and security.
- Active local community and private sector participation, including ecotourism, in all range states as well as maintaining or increasing incentives for these sectors to conserve rhino and biodiversity in general.
- A more culturally-sensitive dialogue between the consumers of rhino horn and the conservation community and an evaluation of the possible dangers and potential benefits of a future opening of a limited legal trade in rhino horn.

Achievement of these goals will lead towards future viable populations of wild African rhinoceroses.



# Acronyms and Glossary

AfERSG	African Elephant and Rhino Specialist Group
AfRSG	African Rhino Specialist Group
AROA	African Rhino Owners Association
ARWG	African Rhino Working Group
AsRSG	Asian Rhino Specialist Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DNPWLM	Department of National Parks and Wildlife Management (Zimbabwe)
DRC	Democratic Republic of the Congo (formerly Zaire)
DWNP	Department of Wildlife and National Parks (Botswana)
ECC	Ecological Carrying Capacity
ERCF	Elephant and Rhino Conservation Facility
ESPU	Endangered Species Protection Unit of the South African Police Service
FAO	Food and Agriculture Organisation of the United Nations
FZS	Frankfurt Zoological Society
GEF	Global Environment Facility
IPZ	Intensive protection zone
IRF	International Rhino Foundation
IUCN	World Conservation Union
IZCN	Institut Zairois pour le Conservation de la Nature
KWS	Kenya Wildlife Service
KZNNCS	KwaZulu-Natal Nature Conservation Service
MPCC	Maximum Productivity Carrying Capacity
NGO	Non-government organisation
PHVA	Population and Habitat Viability Analyses
RCA	Rhino conservation area
RESG	Southern African African Rhino and Elephant Security Group
RMG	Southern African Rhino Management Group
RTCF	US Fish and Wildlife Service's Rhinoceros and Tiger Conservation Fund
SADC	Southern African Development Community
SSC	Species Survival Commission
TCM	Traditional Chinese medicine
TRAFFIC	Trade Records Analysis on Flora and Fauna in Commerce
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature
ZSL	Zoological Society of London

## Words and terms commonly used throughout this Action Plan

**Boma** – a type of strong holding pen in which rhino are placed after capture, before translocation, before release into a new area, or if a rhino is in need of ongoing veterinary attention.

**Biological growth** – the natural increase in a population's size, being the net result of additions from breeding and losses from natural mortalities, expressed as a percentage of the population size at the start of a year.

**Biological management** – management of rhino populations (primarily through adjusting rhino stocking densities, but also managing the densities of other browsers and habitat management) to maintain rapid, healthy population growth, to minimise inbreeding and loss of genetic diversity. Rhino removal and introduction decisions are based on a population's breeding performance, social behaviour, genetic relationships, the rhino density relative to an area's habitat carrying capacity, vegetation conditions etc.

**Breeding performance** – primarily the female reproductive performance of a population. Measured by female ages at first calving, intervals between calving and the average proportion of adult females calving per year. These indicators are affected by habitat quality, stocking densities, adult female to male ratios and age of the females. High rates of biological growth result from good breeding performance.

**Ecological Carrying Capacity (ECC)** – the maximum number of rhino that can be supported by the resources of a specific area. ECC is a practical tool to help managers estimate MPCC (maximum productivity carrying capacity: the desirable stocking rate at which the highest possible growth rates can be attained).

**Contractual Park** – formed following the signing of a contract between a private landowner and a State conservation organisation. The park is managed as a game reserve or national park, often by a formal conservation organisation.

**Cytogenetic** – the science which integrates the methods and findings of cytology (the study of cells) and genetics.

**Discrete populations** – rhino populations where the animals are geographically separate and are not able to breed with other animals in other populations.

**Ex situ** – in captivity and/or out of the natural range of a species.

**Founders** – rhinos used to establish a new population. Effective founder number refers to the number of founders which breed, i.e. those that contribute to the population's original gene pool.

**Guesstimates** (used in keys to tables) – guesstimates indicate the poorest quality of population estimate which are either guesses based on little or no information, or where an existing population estimate is now out of date (i.e. it has been four years since it was updated). Since 1995 guesstimates have been excluded from the official continental statistics compiled by the AfRSG.

**Home range** – the area in which an animal usually resides and moves in search of water, food and shelter.

**In situ** – refers to wild rhino being conserved in natural habitat within the historic range of the species.

**Key population** – An AfRSG rating to indicate a rhino population whose survival is considered critical for the survival of the species.

**Important population** – An AfRSG rating to indicate a rhino population whose survival is considered extremely valuable in terms of survival of the species.

**Maximum Productivity Carrying Capacity MPCC** – the desirable stocking rate at which maximum population growth rates can be attained, usually estimated as 75% of ECC.

**Metapopulation** – a number of populations of a species considered collectively as one big 'herd'. A metapopulation is made up of a number of discrete sub-populations, and animals are sometimes moved from one population to another.

**Notching** – a method of clipping a small section or sections (usually in a small 'v' shape) from a rhino's ear to allow the animal to be easily identified (and monitored) in the wild.

**Outlier** – 'outlying rhinos' or 'outliers' are low numbers of rhinos occurring in highly dispersed situations outside an area where any form of protection is provided.

**Parastatal** – a State organisation that is more autonomous than a government department, often run by a board. Parastatal organisations are free to retain any revenue they earn rather than have to channel it to a central treasury.

**Range state** – a country or state in which rhinos occur.

**Spoor** – tracks and signs of an animal.

**Taxon** (plural taxa) – a taxonomic (classification) group of species especially genus or a smaller group.

**Translocation** – movement of individual rhinos from one area to another either to improve chances of survival, to establish new populations, to keep established populations productive (i.e. at or below estimated MPCC), or to introduce new blood into a population. Rhinos may be translocated to other areas of suitable habitat and to where they may be better protected from poachers.

# Introduction

## The Plan in context

In 1990 the African Elephant and Rhino Specialist Group (AfRSG) published its first African Elephant and Rhino Action Plan (Cumming *et al.*, 1990). The Group identified three areas of action to conserve African rhinos:

**1. Increase political pressure to influence government policy in nations illegally exporting or importing rhino horn;**

The Plan encouraged cooperation with governments to identify key individuals involved in the rhino horn trade and specified that IUCN and other appropriate organisations should raise the profile of rhino conservation issues within international fora.

**2. Promote substitute materials and restrict the rhino horn trade within and between Asian nations;**

Local control of trade was encouraged as well as efforts to seek cooperation from consumer states in reducing demand and finding horn substitutes, both for traditional medicine and dagger handles.

**3. Identify priority areas for the rehabilitation of black rhino populations.**

A decade ago, donor attention was clearly focused on under-funded protected areas facing serious problems and threats. The Plan advocated the need for a process to prioritise black rhino populations for rehabilitation.

Since the 1990 Action Plan was published, the AfRSG and the wider rhino conservation community have made significant advances in identifying the requirements for successful *in situ* rhino conservation. Over the period 1987–97, black rhino numbers increased only in areas rated in the 1990 plan as having both a low need for external funding and support, and a high likelihood of conservation being successful (indices). Black rhino numbers in such parks increased by 32% from 1,088 to 1,437 over the period. In contrast, rhino numbers declined significantly in all other combinations of the two indices.

When looking at the effect of external funding needs alone, black rhino numbers increased by 28% from 1987–1997 in all parks listed as having a low need for external funding and support. However numbers declined by 92% and 75% respectively in parks rated as having high or moderate external funding requirements.

The 1990 Action Plan introduced an index of potential conservation success (Cumming *et al.* 1990). Over the last decade rhino conservation success has been strongly correlated with this index. Rhino numbers increased rapidly in the two populations that had the highest estimated conservation success, and today these populations also

hold the world's biggest populations of both black and white rhino. In contrast, populations of rhino have become extinct in four areas where expenditure was deemed to be less than the estimated level needed.

These findings suggest there are critical threshold levels of funding and effort that must be met to achieve success. In under-funded populations, significant input of donor funds may be required but in some cases, there may simply never be enough funds (Dublin and Wilson 1998). While the focus on eliminating the illegal trade in rhino horn is as strong today as it was 10 years ago, the experience of the past decade indicates that the level of existing funding, organisational capacity, and the level of field efforts are still critically important to rhino conservation. There are however, many other significant factors affecting successful rhino conservation including community participation, size of conservation area, and proximity of rhinos to international borders (AfRSG 1996, Dublin and Wilson 1998).

A central theme of this Action Plan is rhino metapopulation management. A metapopulation refers to a number of discrete populations that are viewed collectively as one herd, usually at a subspecies or subspecies/national level. Before the development of translocation techniques, individual populations were conserved in isolation. Under metapopulation management, rhinos may be moved from one discrete population to another to create new populations, to reduce densities in established populations to maintain good biological growth, or to introduce new blood. National rhino conservation plan goals are usually set at a metapopulation level for each subspecies in the range state.

Throughout the Plan there are many references to, and examples of, rhino conservation work in South Africa, more than for any other range state. This is because most (80%) of Africa's rhinos are found in South Africa and the country has the longest history of successful rhino conservation, and therefore the most extensive experience which should be shared. This does not mean that the conservation of rhinos in other range states is not also important.

## Aims and objectives of the Plan

This Plan provides a reassessment of the status of Africa's rhino populations and highlights the changing priorities for rhino conservation in Africa. We highlight specific actions that have formed and should continue to form part of successful rhino conservation strategies and policies. In particular, we emphasise that adequate field conservation expenditure and effort is critical to success.

# African Rhinoceroses: a Continental Overview

There are five species of rhinoceros: three in Asia and two in Africa. The two African species are the black rhinoceros (*Diceros bicornis*) and the white rhinoceros (*Ceratotherium simum*). The black rhino is principally a browser, using its prehensile upper lip to grasp stems, branches, twigs and leaves, while the white rhino is a grazer and prefers more open grassland and savannah habitats. Because of their recognisably different mouthparts, the black rhino is sometimes referred to as the hook-lipped rhino and the white rhino as the square-lipped rhino. Both species are grey, the white rhino having apparently derived its name from a variation of the early Cape Dutch word *wijdt* meaning wide.

Brief popular descriptions of the behaviour, habitats and biology of both species can be found in Mills and Hes (1997) and Estes (1991).

Both species have recognised subspecies, as outlined below:

## Black rhino subspecies

Western (*Diceros bicornis longipes*)

Eastern (*Diceros bicornis michaeli*)

South-western (*Diceros bicornis bicornis*)

South-central (*Diceros bicornis minor*)

## White rhino subspecies

Northern (*Ceratotherium simum cottoni*)

Southern (*Ceratotherium simum simum*)

## Black rhinoceros subspecies

The four recognised black rhino subspecies occur in different areas (figure 2.1). Historically, the boundaries between the subspecies were not 'hard-edged' like the boundary distinguishing the two white rhino subspecies. Despite this, there are major differences between the habitat and climates in the core areas of the subspecies' distributions, and it is likely that each has specific genetic or behavioural adaptations to its environment. For this reason, conservationists sometimes refer to the black rhino subspecies as ecotypes, but in this Action Plan the term subspecies is used.

## Western black rhinoceros (*Diceros bicornis longipes*)

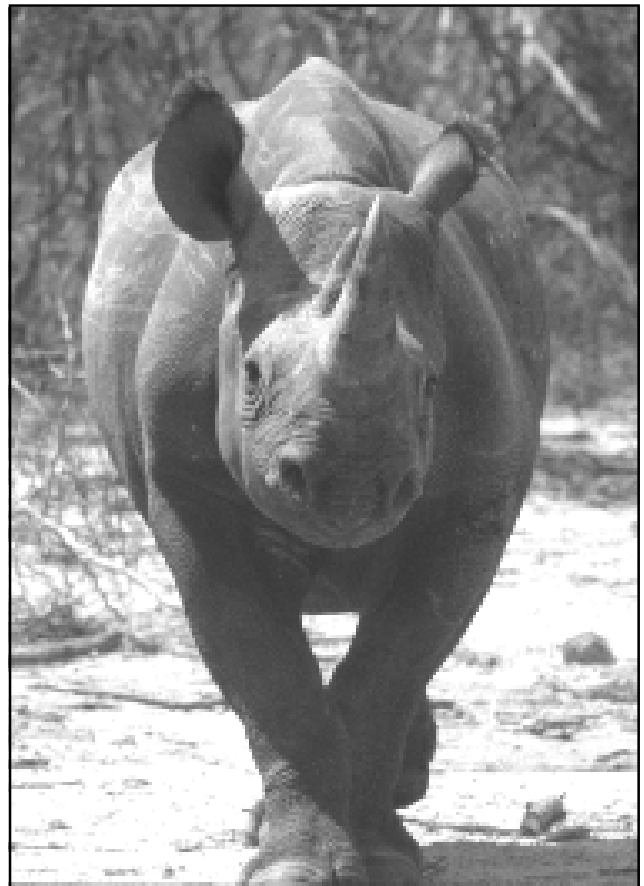
This is the rarest and most endangered subspecies of black rhino. Once ranging through the savannah zones of central-

west Africa, only a few scattered animals now remain in northern Cameroon. A few western black rhinos may remain in Chad, although this is unlikely, and is yet to be confirmed. Numbers continue to decline and the subspecies is threatened with extinction in the near future. Most of the remaining animals appear to live in small groups that are widely scattered and may not be in breeding contact.

## Eastern black rhinoceros (*Diceros bicornis michaeli*)

This subspecies has longer, more slender and more curved horns than the two southern subspecies, and is reputedly more aggressive. Some eastern black rhinos have very distinctive skin ridges on their sides giving them a 'corrugated' appearance. Historically this subspecies was distributed from southern Sudan, Ethiopia, and Somalia through Kenya into northern-central Tanzania. Its

Black rhino (*Diceros bicornis*).



Sue Mainka

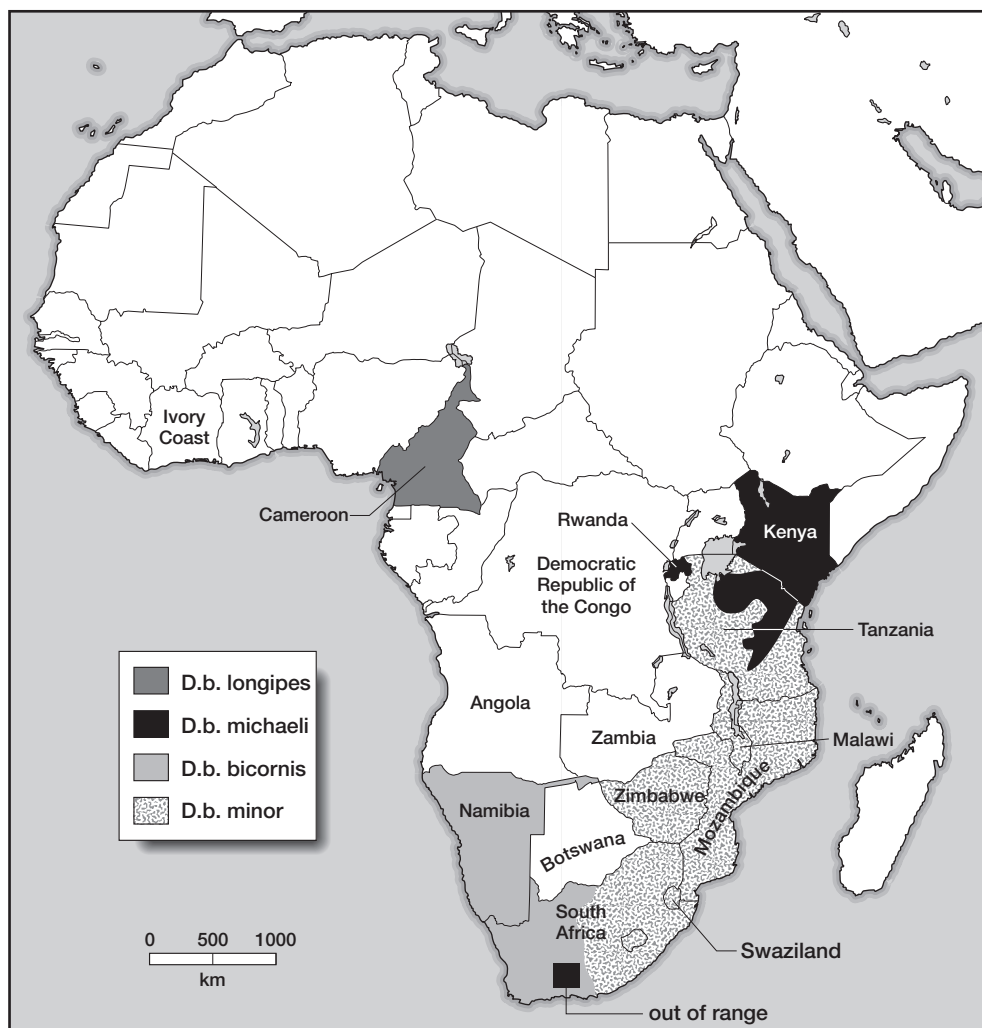


Figure 2.1. Distribution of the four black rhino subspecies 1997. For security reasons precise locations of populations are not shown.

current stronghold is Kenya. Small numbers are still to be found in Rwanda and Tanzania, but its presence in Ethiopia needs confirmation. One important free-ranging population of this subspecies occurred outside its range in Addo Elephant National Park in South Africa but these animals were moved to a private game reserve and are being moved to another national park to allow *D.b. bicornis* to be introduced into Addo.

### South-western black rhinoceros (*Diceros bicornis bicornis*)

The original range of this larger, straighter-horned and more arid-adapted subspecies included Namibia, southern Angola, western Botswana and south-western South Africa. Significant populations have remained in the desert and arid savannah areas of Namibia, which is today the stronghold for this species. In recent years some small populations have been re-established elsewhere in Namibia and in the south-western part of South Africa. A few animals may still exist in Angola.

### South-central black rhinoceros (*Diceros bicornis minor*)

This is the most numerous of the black rhino subspecies, and occurred historically from western and southern Tanzania through Zambia, Zimbabwe, and Mozambique to the northern and eastern parts of South Africa. It also probably occurred in southern Democratic Republic of the Congo (formerly Zaire), northern Angola, and eastern Botswana. Today, its stronghold is South Africa and to a lesser extent Zimbabwe, with smaller numbers remaining in Swaziland, southern Tanzania and Mozambique. The south-central black rhino is now believed to be nationally extinct in Botswana, Zambia, and possibly also Angola (although, information is inadequate from this country because of the civil war).

### Black rhinoceros: historical survey

Early in the 19th century the black rhinoceros was the most numerous of the world's rhino species, with several



Black rhino (*Diceros bicornis*), Kenya.

Peter Jackson

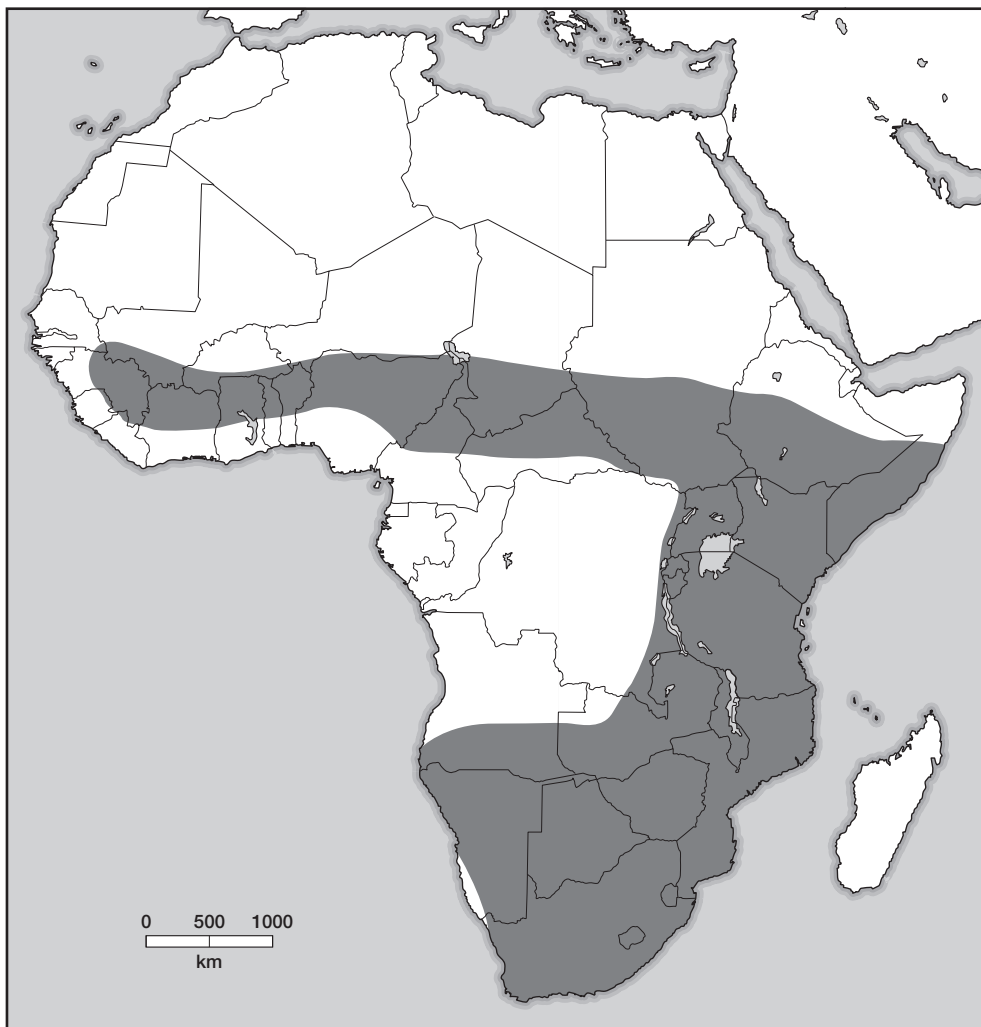


Figure 2.2. Probable distribution of the black rhinoceros, c.1700 (from Cumming *et al.* 1990).

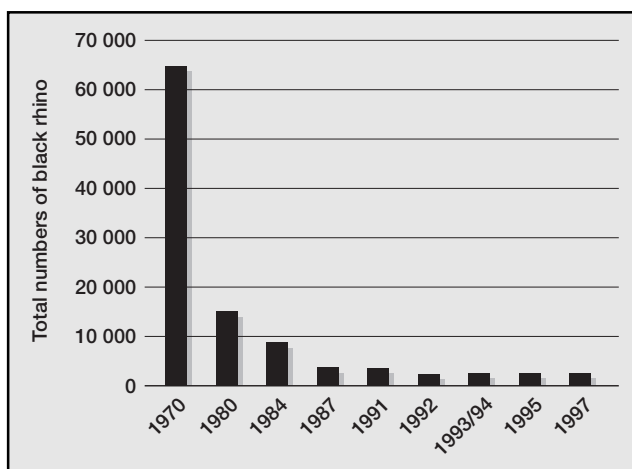


Figure 2.3. The decline of the black rhinoceros in Africa, 1970–1997.

hundred thousand animals roaming the African continent from central-west Africa to the slopes of Table Mountain in the far south (figure 2.2). Early European travellers reported black rhino to be both widespread and common throughout much of the continent.

During the 19th century, as European influence over land use and trade strengthened, the black rhino was hunted relentlessly across most of central-west and eastern Africa. In southern Africa only two breeding populations

of about 110 animals had survived by 1933. In Kenya, approximately 1,000 black rhinos were shot between 1946 and 1948 by a game control officer and his colleagues who were preparing the Makueni area for agricultural settlement (Brett 1993).

Despite this onslaught, it has been estimated that there may still have been as many as 100,000 black rhino in Africa in 1960 (although no official Africa-wide statistics were compiled until 1980). Black rhino numbers continued to decline during the 1960s, and by 1970 it was estimated that there were approximately only 65,000 black rhinos left. At this time, Kenya had the largest number with an estimated 18,000 (E. B. Martin, pers. comm.).

Poaching pressure escalated during the 1970s and 1980s as a result of the rising demand for rhino horn in Asia and the Middle East (see chapter 6). These years were also marked by economic and political instability in a number of range states, which presented commercial poachers with a virtual free hand to hunt rhinos with little likelihood of apprehension. Between 1970 and 1992, the black rhino suffered a 96% reduction in numbers (figure 2.3).

In 1980, Tanzania, Zambia, and the Central African Republic remained the major range states for the black rhino (although the accuracy of population estimates at this time is questionable). Collectively these countries may have held around 9,500 black rhino, almost two-thirds of all black rhino in Africa, and each was home to

Table 2.1. Black rhino population estimates, by country, 1980–1997.

	1980	1984	1987	1991	1992	1993/4	1995	1997
Angola	300	90	–	50	50	10	–	0?
Botswana	30	10	<10	<10	5	4	0?	0?
Cameroon	110	110	30?	50	35	27	7	10 <sup>a</sup>
Central African Republic	3,000	170	10	5	0	–	–	–
Chad	25	5	3	0?	0	–	–	–
Ethiopia	20	10	–	0?	0?	5	1 <sup>a</sup>	0?
Kenya	1,500	550	381	398	414	417	420 <sup>a</sup>	424 <sup>a</sup>
Malawi	40	20	25	5	0?	2	2	3
Mozambique	250	130	–	50	50	45	–	13 <sup>a</sup>
Namibia	300	400	449	479	489	583	598	707
Rwanda	30	15	15	–	15	10	4	4
Somalia	300	90	–	0?	0	–	–	–
South Africa	630	640	577	771	819	897	1,024	1,043
Sudan	300	100	3	–	–	0	–	–
Swaziland	0	0	6	6	6	4	9	10
Tanzania	3,795	3,130	275	185?	127	132	32 <sup>a</sup>	46
Uganda	5	0?	–	3	0	–	–	–
Zambia	2,750	1,650	>106	40?	40	33	0?	0?
Zimbabwe	1,400 <sup>b</sup>	1,680 <sup>b</sup>	>1,775	1,400	425	381 <sup>c</sup>	315 <sup>c</sup>	339
<b>Total</b>	<b>14,785</b>	<b>8,800</b>	<b>3,665</b>	<b>3,450</b>	<b>2,475</b>	<b>2,550</b>	<b>2,410</b>	<b>2,600<sup>a</sup></b>

**Notes:**

Totals have been rounded to the nearest 5 rhino

<sup>a</sup> Minimum estimates – speculative estimates for populations are not included.

<sup>b</sup> The 1980 and 1984 official population estimates for Zimbabwe reflect minimum population estimates. In 1980 the true figure may have been more than 2,500.

<sup>c</sup> The 1993/4 estimates for two Zimbabwe areas have subsequently been shown to be gross over-estimates, while the total number of black rhinos in known populations in intensive protection zones and sanctuaries remained stable from 1993/4 to 1995 and have since been increasing.

? estimate – reliable data unavailable.

– data unavailable.

Sources: AfERSG data (1980, 1984, 1987); AfRSG data (1992, 1994, 1996, 1998), and Brett (1993).

more black rhinos than now exist across the whole of Africa (2,600 individuals). Today, the black rhino is nationally extinct in the Central African Republic and probably nationally extinct in Zambia, with only a few remaining in Tanzania.

The biggest declines since 1980 have occurred in the vast unfenced areas where large numbers of black rhino used to roam, but where funding and manpower were insufficient to support adequate patrolling. Almost all the rhinos that used to live in such areas have been poached and in some cases, the remaining survivors were translocated to areas where they could be better protected. Examples of such areas include the Luangwa Valley (Zambia), Tsavo (Kenya), Chobi/Morembi (Botswana), Zambezi Valley (Zimbabwe/Zambia) and the Selous Game Reserve (Tanzania). The difficulty of patrolling vast areas of bush was highlighted as early as 1924 (Lang 1924), and more recently by others (Leader-Williams 1988; Leader-Williams *et al.* 1990; Brett 1993), who recognised that law enforcement activities to counter poaching are much more effective when concentrated in selected areas.

In recent years, the decline in black rhino numbers across the African continent appears to have eased and some of the best protected and managed populations have shown healthy increases for a number of years, with some additional populations now experiencing a slight increase. Some argue that this is proof that international and domestic bans on trade in illegal rhino horn are starting to work. Others argue that it is because most surviving black rhino now live in smaller, more intensively protected

populations (for example, in sanctuaries and rhino conservation areas – see chapter 3) within countries that generally have a greater capacity for, and commitment to conservation. Most of the vulnerable rhino – those in extensive, poorly protected wildlife areas – have already been killed by poachers.

The only two countries to show a net increase in numbers of black rhino over the period 1980-97 were South Africa and Namibia where investments in conservation strategies including monitoring and law enforcement have been high. These two countries, which in 1980 held only 6% (930) of Africa's black rhinos, today hold 67% (1,750). These gains cancelled out the declines in other range states, accounting for the stability in black rhino numbers from 1992 to 1995. Encouragingly, the black rhino estimate of 2,599 animals in 1997 indicates that some populations have started to recover, with numbers rising in the major rhino range state of Zimbabwe, for example, for the first time in a decade.

## White rhinoceros subspecies

The two white rhino subspecies, the northern and the southern, have a strikingly discontinuous range (figure 2.4).

Previous grounds for separation between the subspecies based on physical differences (Smith *et al.* 1995) have been corroborated by recent mitochondrial DNA studies by Professor Eric Harley (*in litt.*), which indicate that the two



White rhino (*Ceratotherium simum*), Umfolozi Game Reserve.

Sue Mainka



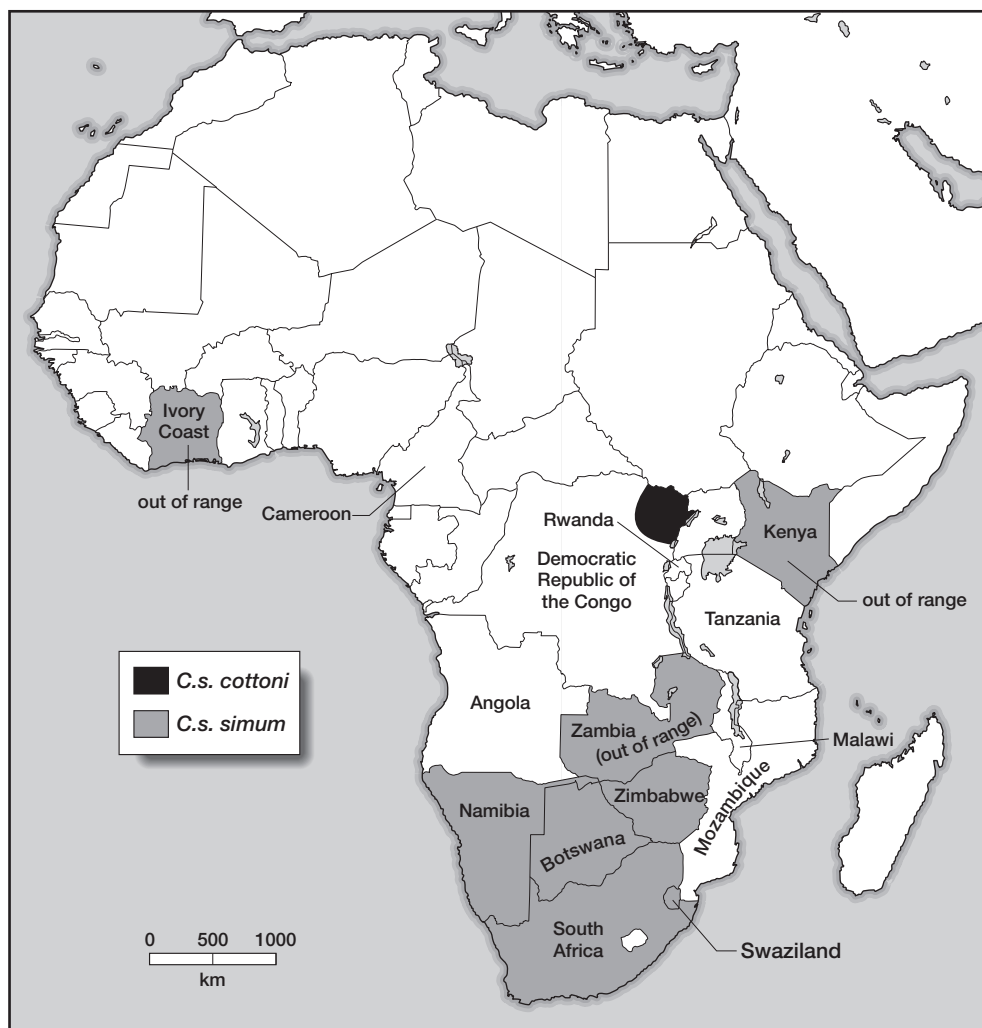


Figure 2.4. Current distribution of the northern and the southern white rhino. For security reasons precise locations of populations are not shown.

white rhino subspecies have greater genetic differences than the four subspecies of the black rhino (Smith *et al.* 1995).

### Northern white rhinoceros (*Ceratotherium simum cottoni*)

This subspecies used to range over parts of north-western Uganda, southern Chad, south-western Sudan, the eastern part of Central African Republic, and north-eastern Democratic Republic of the Congo, formerly Zaire (Sydney 1965). The local distribution was probably determined by suitable grassland habitats, sparse savannah woodland, availability of water, and the proximity of human settlement (Hillman-Smith *et al.* 1986). As a result of poaching, the only wild northern white rhino population known today occurs in north-eastern Democratic Republic of the Congo, although there have been unconfirmed reports of a few isolated animals surviving in southern Sudan (Smith *et al.* 1995, P. Winter pers. comm.). Surveys in April and June 1998 confirmed that the population in the Democratic

Republic of the Congo numbered 25 individuals, a decrease from 31 in 1995 (Mackie 1998, Smith *in litt.*).

### Southern white rhinoceros (*Ceratotherium simum simum*)

Once widespread in the bushveld of southern Africa (Acocks 1988), this subspecies was on the brink of extinction by the end of the 19th century having been reduced to just one small population of approximately 20 animals. However, by 1997, after years of protection and many translocations, numbers of this subspecies had grown to over 8,440 in 247 wild populations, with a further 650 animals in captivity. The southern white rhino is now the most numerous of the rhino taxa and its recovery has been internationally recognised as one of the world's greatest conservation successes.

Today, South Africa is the stronghold for this subspecies, with much smaller reintroduced populations occurring within its former range in Botswana, Namibia, Swaziland, and Zimbabwe. Populations of free-ranging



WWF-Canon/Kes & Fraser Smith

Northern white rhinoceros (*Ceratotherium simum cottoni*), Garamba National Park, Democratic Republic of the Congo.

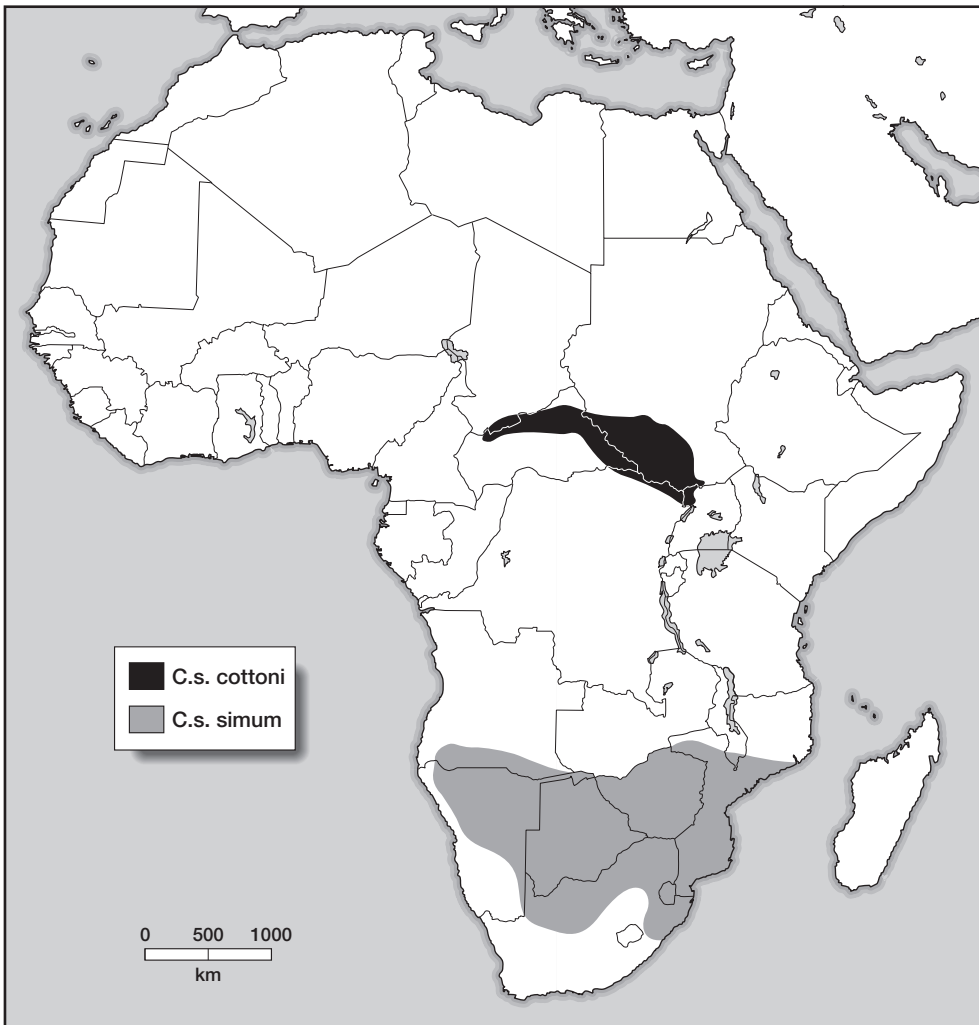


Figure 2.5. Probable historical distributions of the southern white rhinoceros (c.1800; from Cumming *et al.* 1990), and the northern white rhinoceros (c.1900; from Hillman-Smith *et al.* 1986).

southern white rhino have also been established outside their historical range in Ivory Coast, Kenya, and Zambia (it is not clear whether the historical range of the species included Zambia).

## White rhinoceros: historical survey

Historically, the white rhino had a much more restricted distribution than the black rhino. While the black rhino has also adapted to survive in drier or cooler climates and to forests and nutritionally poorer areas, the white rhino has remained a dweller of grasslands and savannah woodlands. The past distribution of the two subspecies of white rhino, the northern and the southern, is shown in figure 2.5.

As today, the range was strikingly discontinuous (Ansell 1967). Within recorded history, no white rhino have been known to inhabit the area between the south-eastern limits of the northern subspecies (the River Nile, northern Democratic Republic of the Congo, and Uganda), and the northern limits of the southern subspecies (the Zambezi River), a distance of some 2,000km (Hillman-Smith *et al.* 1986). However, fossil records and cave paintings indicate that the white rhino possibly had a more continuous range until separated by climatic and vegetation changes during the last ice age. Conflicting evidence suggesting that the distributions were separated more recently comes from Meave Leakey who reportedly found fossil evidence of white rhino near Lake Nakuru dated at 1,500 years (K. Hillman-Smith *in litt.*). It is not known whether the fossils belonged to the northern or the southern subspecies.

The northern white rhino only became known to the scientific world in 1903 (Hillman-Smith *et al.* 1986), and at the time of its ‘discovery’, appeared to be locally common within a limited area (K. Hillman-Smith *in litt.*).

In the 19th century, the northern white rhino was significantly more numerous than the southern, which came perilously close to extinction. Nevertheless, Edmund Heller (1913) commented on the rarity of the northern white rhino compared with the large numbers of black rhino at that time. It may be that the northern white rhino was always a rarer subspecies.

As early as 1924, H. Lang had noted that the northern white rhino was an important part of the diet of local Africans. Lang also expressed concern that there seemed to be “no effective means” to stop the “wholesale slaughter of the northern form” since proper policing of the vast areas was “practically impossible” (Lang 1924). At this time Khartoum acted as the major holding centre for horn and hide being transported to the South-East Asia. Lang called for “more drastic enforcement as regards confiscations and fines for the transportation, sale and exportation of horns and pieces of hide”. Garamba National Park in the Democratic Republic of the Congo formed in 1938 and Southern National Park in Sudan formed in 1939 were both created largely to protect the northern white rhino (K. Hillman-Smith, *in litt.*).

Poaching for horn, hide, and meat resulted in a great reduction in the number of northern white rhino (Ansell 1967), yet in 1960, the northern white rhino was still more numerous than its southern relative, with about 2,250 individuals distributed across five countries.

In the 1960s, Sudan was one of two main strongholds for the northern white rhino, with an estimated 1,000 animals still surviving in 1960 (Schomber 1963). Between 1957 and 1963 numbers in Uganda decreased rapidly, and by 1963 no more than 80 were thought to remain west of the Nile in Uganda (Cave 1963). Numbers were also very low in the Central African Republic and in Chad (Bourguoin 1958, Blancou 1958, Ansell 1967). By 1970 it was estimated that there were only about 650 northern white rhino left in Africa. The majority of these were to be found in the Sudan and what was then Zaïre, now the Democratic Republic of the Congo. By 1984, the northern white rhino had become extinct in Uganda, Central African Republic and Chad, and today the only confirmed remaining population is in the Democratic Republic of the Congo. As described in the Country Reports (chapter 8), the Democratic Republic of the Congo has suffered many years of civil war and political unrest. The civil war in neighbouring Sudan and the abundance of automatic weapons and cross-border poaching gangs have made protection of its rhinos very problematic. The future of the northern white rhino is by no means assured.

**Table 2.2. Northern white rhinos by country, 1960–1998.**

	1960	1971	1976	1981	1983	1984	1991	1995	1998
Central African Republic	few	few	few	few	few	0?	–	–	–
Chad	few	few	?	?	0?	0?	–	–	–
Democratic Republic of the Congo	1,150	250	490	<50	13–20	15	30	31	25
Sudan	1,000	400	?	<300	<50	0?	0?	0?	0?
Uganda	80	few	few	Few	2–4	0?	– <sup>a</sup>	–	–
<b>TOTAL</b>	<b>2,230</b>	<b>650</b>	<b>500+</b>	<b>&lt;350</b>	<b>&lt;70</b>	<b>15</b>	<b>30</b>	<b>31</b>	<b>25</b>

**Notes:**

a nationally extinct

? information unreliable

– information unavailable

Sources: AfRSG data, Pierret *et al.* 1976, Hillman and Smith 1983, Smith *et al.* 1995, and K. Hillman-Smith, *in litt.*

**Table 2.3. Numbers of southern white rhinos, by country, 1895–1997.**

	1895	1929	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
Angola <sup>c</sup>	0	0	0	0	?	0	0	0	0	0	0
Botswana	0	0	0	0	190	125	56	27	18	20	23
Ivory Coast	0	0	0	0	0	0	5	5	5	4	4
Kenya	0	0	0	0	33	47	57	74	87	122	137 <sup>b</sup>
Mozambique <sup>c</sup>	0	0	0	0	1	–	–	–	–	–	–
Namibia	0	0	0	0	70	63	80	91	98	107	141
South Africa	20	150	550	1,800	3,234	4,137	5,057	5,297	6,376 <sup>a</sup>	7,095	7,913
Swaziland	0	0	0	0	60	80	60	46	33	41	50
Zambia	0	0	0	0	10	6	0	–	6	5	6
Zimbabwe	0	0	0	0	200	208	250	249	134	138	167
<b>TOTAL<sup>d</sup></b>	<b>20</b>	<b>150</b>	<b>550</b>	<b>1,800</b>	<b>3,800</b>	<b>4,665</b>	<b>5,565</b>	<b>5,790</b>	<b>6,760</b>	<b>7,530</b>	<b>8,440</b>

**Notes:**

a The increase in numbers in South Africa between 1992 and 1993/94 is partly due to improved population estimates for rhinos on private land and improved estimates for Kruger Park.

b The increases in 1997 are partly the result of the introduction of rhinos from South Africa.

c White rhino were reintroduced to both Angola and Mozambique but appear to have become nationally extinct there for the second time.

d Totals have been rounded to the nearest five rhino.

Within its range, the southern white rhino was still frequently seen in the mid 19th century and many were hunted. F. C. Selous reports that in either 1847 or 1848 two hunters killed 89 rhino, the majority probably being white rhino (Player 1972). The relentless hunting of rhinos for sport and meat by Europeans, and the killing of rhinos in areas being opened up for agriculture, left just 20 southern white rhinos. These survived in one population in the Umfolozi area of what today is Hluhluwe-Umfolozi Park in KwaZulu-Natal, South Africa. Under protection, numbers in Hluhluwe-Umfolozi increased rapidly until

1961 when translocation techniques were successfully developed and surplus animals were routinely translocated from the Park to establish new populations (Player 1972).

### The African rhinoceros population, 1997: a summary

The most recent population estimates for each species and subspecies are given in Table 2.4. The countries listed are those known to have held rhino populations which have

**Table 2.4. Estimated African rhino numbers, 1997.**

Species	Black rhino					White rhino			ALL	
	Subspecies	<i>D.b. longipes</i> Western	<i>D.b. michaeli</i> Eastern	<i>D.b. bicornis</i> South-western	<i>D.b. minor</i> South-central	All	<i>C.s. cottoni</i> Northern	<i>C.s. simum</i> Southern		All
Angola				Ex?	Ex?	Ex?				0
Botswana						Ex?		23	23	23
Cameroon		10				10				10
Central African Republic						Ex				0
Chad		Ex				Ex?	Ex			0
Democratic Republic of the Congo							25		25	25
Ethiopia			Ex?			Ex?				0
Ivory Coast								4	4	4
Kenya			424			424		137	137	561
Malawi					3	3				3
Mozambique					13	13		Ex		13
Namibia				707		707		141	141	848
Rwanda			4			4				4
Somalia			Ex?			Ex?				0
South Africa			33	34	976	1,043		7,913	7,913	8,956
Sudan			Ex?			Ex?	Ex			0
Swaziland					10	10		50	50	60
Tanzania			24		22	46				46
Uganda						Ex	Ex			0
Zambia					Ex?	Ex?		6	6	6
Zimbabwe					339	339		167	167	506
<b>Totals*</b>		<b>10</b>	<b>485</b>	<b>740</b>	<b>1,365</b>	<b>2,600</b>	<b>25</b>	<b>8,440</b>	<b>8,465</b>	<b>11,065</b>

**Notes:**

Ex = nationally extinct; Ex? = believed to be nationally extinct. \*Totals have been rounded to the nearest five rhino.

Sources: AfrSG data (1998) with some totals updated in June 1998.

either become nationally extinct in the last 30 years or which currently hold wild populations.

In 1997, there were 248 discrete white rhino populations and 83 discrete black rhino populations in Africa.

The significance of South Africa as a key range state and, to a lesser extent, that of Namibia, Kenya, and Zimbabwe, is very marked. These four range states hold 98% of Africa's remaining rhinos, with South Africa alone holding over 80% of all black and white rhinos. In sharp

contrast, the small size of the remaining and/or introduced rhino populations in Cameroon, Ivory Coast, Malawi, Mozambique, Rwanda, and Zambia makes their continued survival particularly problematic. Furthermore, many of the countries within the historical range of the African rhinoceros had no rhinos by 1997. The conservation histories and current management strategies of all these range states are outlined in the Country Reports (chapter 8).

# Rhinoceros Populations in the Wild and Semi-wild

## Wild, semi-wild, and captive populations: definitions

The following definitions have been developed and adopted by the African Rhino Specialist Group AfRSG (Leader-Williams *et al.* 1997), based on an original scheme developed by Stanley-Price (1993) and a later standard by the captive breeding community (Foose 1995). The aim is to promote a standard terminology that would prevent any ambiguity in the use of terms such as *captive*, *wild*, *semi-wild*, *in situ*, *ex situ*, *sanctuary*, and *intensive protection zones*. It is critical that there should be no confusion over the distinction between wild and captive populations, as this could lead to a reduction in focus and effort to conserve existing rhino populations in their natural, wild habitats.

Three key diagnostic features are used to distinguish **wild**, **semi-wild**, and **captive** rhino populations (Leader-Williams *et al.* 1997):

- the size of land area they occupy
- whether breeding is natural or manipulated
- the degree of compression (density of animals), food supplementation, husbandry, and veterinary care.

A ‘natural breeding system’ refers to situations where mating opportunities are not controlled. ‘Manipulated breeding’ refers to situations where mating opportunities between individual rhinos are controlled using pedigree analysis to improve the genetic make-up of the population.

This definition excludes the removal of individuals to minimise in-breeding between closely related individuals in wild free-ranging populations, and the introduction of additional rhinos to wild free-ranging populations to enhance genetic diversity and population viability.

‘Compression’ is the term used to describe situations where management creates a higher than natural density (i.e. a smaller area per animal than in natural conditions) to the extent that the survival of individuals inevitably requires regular supplementary feeding. The degree of food supplementation can be categorised as either low, medium or high. Other factors distinguishing wild and captive populations include the levels of sanitation management, passive handling (husbandry) and veterinary intervention, which are high in captive populations.

In the definitions that follow, the terms *in* or *out of range* refer to the known historical range of the subspecies or taxon. They are similar in meaning to the terms *in situ* and *ex situ* and can be used as a prefix to describe the type of rhino population.

## Wild populations

Free-ranging wild rhinos live in large to medium (>10km<sup>2</sup>) areas, generally in the historical range of the taxon, at natural densities and spacing, without routine food supplementation, and with only very occasional husbandry



White rhinoceros (*Ceratotherium simum*) at Hluhluwe-Umfolozi Park, South Africa.

KwaZulu-Natal Nature Conservation Service (KZN NCS) photolibrary

and veterinary intervention. They have a *natural breeding system*.

## Semi-wild populations

Semi-wild populations of rhinos occur mainly in small (<10km<sup>2</sup>) areas, either in or out of the historical range of the taxon. They live at a compressed density and spacing, requiring routine partial food supplementation and a high degree of management, but breed naturally.

## Captive breeding populations

Captive populations of rhinos usually occur in small to very small areas (<1km<sup>2</sup>), either in or out of the historical range of the taxon. They have a compressed density and spacing, require partial or full food supplementation with frequent husbandry and veterinary intervention, and have a *manipulated breeding system*. In such situations rhinos may be often held in special pens or barns, and may have controlled access to limited areas of natural habitat.

Within captive breeding situations there is a range of breeding areas, from very small pens to larger more free-ranging situations. These too have been defined (Leader-Williams *et al.* 1997) so that everyone working with rhinos, whether in captive breeding institutions or in range states, uses a standard terminology.

**Paddock:** an area where manipulated breeding of rhinos is practised, both in and out of range, and where rhinos are confined in an area of between 0.1km<sup>2</sup> and 10km<sup>2</sup>. The area will contain natural or modified vegetation and rhinos will require partial food supplementation and a high level of husbandry. The Wilds in Ohio and White Oak in Florida are examples of large-scale paddock management systems for rhinos.

**Pen:** much smaller than a paddock, usually not exceeding 0.05km<sup>2</sup>. The rhinos are fully dependent on supplemented food and require a very high level of husbandry, veterinary care, and sanitation. Many standard zoo exhibits are pens.

## Procedures for the identification of *key* and *important* rhino populations

The history of non-government-supported rhino projects has often been punctuated by failures. Donor money must be focused where it can have the greatest chance of contributing to the successful conservation of the rhino subspecies. The AfRSG has therefore developed a method of prioritising action by identifying rhino populations according to their conservation value. This population-focused approach greatly benefits conservation

organisations, helping to concentrate their efforts to ensure that, at least, the *key* and *important* populations of the six subspecies are protected. The ratings also help donors who need guidance in assessing funding priorities within the wide scope of African rhino conservation.

The populations with the highest conservation value are categorised as either *key* or *important*, according to the criteria laid out in the tables below. The *key* populations are those whose survival is considered critical for the wider survival of the subspecies; the *important* populations are considered extremely valuable for the survival of the subspecies.

The three most relevant parameters by which to judge the conservation value of rhino populations are:

- population size
- the significance of the population in conserving the relevant subspecies
- the likelihood of protection/conservation measures being effective (also used for rating funding proposals).

The reasoning behind the third parameter is that funds are used more effectively in programmes directed at stable or expanding rhino populations than in programmes that try to reverse trends occurring in unstable populations or where management programmes are either poorly developed or non-existent. The only exception would be where a population represents a significant proportion of the subspecies (as in the case of the remaining northern white rhino in the Democratic Republic of the Congo).

The best measure of the likely effectiveness of conservation measures is considered to be the recent performance of the population - expressed as the population trend (increasing, decreasing, or stable) over the previous three to five years. This trend should reflect the underlying performance of the population (i.e. net biological growth minus the number poached but excluding changes due to translocations or improved population estimation). For example, a population that has declined in number can still be rated as increasing if the reason for the decline is the translocation of a number of animals, and the underlying net reproductive performance of the population has been positive.

A number of major donor agencies (e.g. World Wide Fund for Nature and the US Fish and Wildlife Service's Rhino and Tiger Conservation Fund) have been prioritising their rhino conservation effort for several years. These donors have focused on successfully protecting and breeding up the *key* populations critical to the survival of each subspecies, thereby assuring the future of the six taxa of African rhinos. Projects involving continentally *important* populations are given a higher conservation status than those that only affect very small populations (those that do not qualify for rating as either *key* or *important*). The identification and listing of the continent's *key* and *important* populations is considered

Table 3.1. Categorisation of <i>key</i> rhino populations.	
Category	Criteria
Key 1	<ul style="list-style-type: none"> <li>Population (n) increasing or stable and n &gt; 100</li> </ul> or
Key 2	<ul style="list-style-type: none"> <li>n &gt; 50% of the subspecies</li> <li>Population increasing or stable and n = 51–100</li> </ul> or
Key 3	<ul style="list-style-type: none"> <li>n = 26 to 50% of subspecies</li> <li>Population decreasing &lt;25% and n &gt; 50</li> </ul> or
	<ul style="list-style-type: none"> <li>n &gt; 25% of subspecies</li> <li>Population decreasing &gt; 25% and n &gt;100</li> </ul>

Table 3.2. Categorisation of <i>important</i> rhino populations.	
Category	Criteria
<i>Important 1</i>	Population increasing or stable and n = 20 to 50
<i>Important 2</i>	Population trend unknown or decreasing >25% and n = 51 to 100
<i>Important 3</i>	Population decreasing, but n = 20 to 50 in breeding contact in a protected area
<i>Important 4</i>	n = >20 dispersed outside or within a protected area with good potential for consolidation in an area which can take at least 20 founders

Table 3.3. Listing of <i>key</i> and <i>important</i> African rhino populations.		
<b>Black Rhino</b>		
<b>Key 1</b>	<b>Key 2</b>	<b>Important</b>
<ul style="list-style-type: none"> <li>Cameroon metapopulation</li> <li>Hluhluwe-Umfolozi Park</li> <li>Greater Kruger (Kruger National Park and adjoining Private Game Reserves (S/P))</li> <li>2 Namibian populations (1C)</li> </ul> Number of populations = 5	<ul style="list-style-type: none"> <li>Aberdare National Park (whole area)</li> <li>Bubiana Conservancy (PC)</li> <li>Umkhuze Game Reserve</li> <li>Nairobi National Park</li> <li>Save Valley Conservancy (PC)</li> <li>Sinamatella IPZ</li> </ul> Number of populations = 6	<ul style="list-style-type: none"> <li>Addo Elephant National Park</li> <li>Gourlay's Block (PC)</li> <li>Great Fish River Reserve</li> <li>Ithala Game Reserve*</li> <li>Lake Nakuru National Park</li> <li>Malilangwe (PC/P)*</li> <li>Masai-Mara National Reserve (M)</li> <li>Matusadona IPZ</li> <li>1 Namibian population</li> <li>Ndumo Game Reserve</li> <li>Ngulia Rhino Sanctuary (Tsavo)</li> <li>Oi Pejeta (PC)</li> <li>Pilanesberg National Park</li> <li>Solio Game Ranch (PC/P)</li> <li>1 Tanzanian population</li> <li>Tsavo East NP</li> <li>Tembe Elephant Park</li> </ul> Number of populations = 17
<b>White rhino</b>		
<b>Key 1</b>	<b>Key 2</b>	<b>Important</b>
<ul style="list-style-type: none"> <li>Garamba National Park</li> <li>Greater Kruger (Kruger National Park and adjoining private game reserves (S/P))</li> <li>Hluhluwe-Umfolozi Park</li> <li>Umkhuze Game Reserve</li> <li>Pilanesberg National Park</li> </ul> Number of populations = 5	<ul style="list-style-type: none"> <li>Ithala Game Reserve</li> <li>Solio Game Ranch (PC/P)</li> <li>Madikwe Game Reserve</li> <li>Manyaleti Game Reserve</li> <li>2 South African Private reserves (P)</li> </ul> Number of populations = 6	<ul style="list-style-type: none"> <li>Lake Nakuru National Park</li> <li>1 Namibian population</li> <li>Ndumo Game Reserve</li> <li>Malilangwe (PC/P)*</li> <li>Tembe Elephant Park</li> <li>Atherstone Game Reserve</li> <li>Borakalalo National Park</li> <li>Botsalanao Game Reserve</li> <li>Iwaba (P)</li> <li>Lewa Downs (P)</li> <li>Loskop Dam Nature Reserve</li> <li>Mafikeng Game Reserve</li> <li>Matobo IPZ</li> <li>1 Namibian population (P)</li> <li>Songimvelo Game Reserve</li> <li>Spioenkop Nature Reserve</li> <li>Weenen Nature Reserve</li> <li>Willem Pretorius Game Reserve</li> <li>14 South African private reserves (P)</li> <li>1 Swaziland reserve (P)</li> </ul> Number of populations = 33
<b>Notes:</b> A number of populations have not been named for security reasons. All populations are in State-run protected areas unless indicated: P = privately owned rhino; PC = private custodianship; S/P = State and private land combined to form one population; C = communal; M = municipal/county council * Populations whose status is known to have changed since 1997		



**Table 3.4. Key and important African rhinoceros populations by country.**

SPECIES	Black			White			Rated populations Key & Imp.
	Key 1	Key 2	Imp.	Key 1	Key 2	Imp.	
<b>Cameroon</b>	1	0	0	0	0	0	1
<b>Democratic Republic of the Congo</b>	0	0	0	1	0	0	1
<b>Kenya</b>	0	2	6	0	1	2	11
<b>Namibia</b>	2	0	1	0	0	2	5
<b>South Africa</b>	2	1	6	4	5	25	43
<b>Swaziland</b>	0	0	0	0	0	1	1
<b>Tanzania</b>	0	0	1	0	0	0	1
<b>Zimbabwe</b>	0	3	3	0	0	3	9
<b>TOTAL</b>	5	6	17	5	6	33	72

Source: Based on 1997 population estimates (compiled April 1998) which have been updated to include one newly founded important population in Zimbabwe and the downgrading of the status of the Ithala black rhino population from key 2 to important following removals to reduce densities.

to be a necessary precursor to prioritising proposed projects.

Tables 3.1 and 3.2 list the criteria used to categorise *key* and *important* populations. There are three sub classes within the *key* category and four sub classes within the *important* category with decreasing priority from one to three and one to four respectively. Table 3.3 lists the current *key* and *important* populations; and Table 3.4 gives the number of rated populations by country and species.

Table 3.4 shows that 11 of the white rhino populations (4.4%) and 11 of the black rhino populations (14.3%) are currently rated as *key*. There are an additional 17 *important* black rhino populations (17.9%) and 33 *important* white rhino populations (13.3%). About (68%) of the black rhino population and about (82%) of the white rhino populations are not rated.

Not surprisingly, the four main range states (South Africa, Namibia, Kenya, and Zimbabwe) have most of the rated populations. From 1995–1998 the number of rated rhino populations in Africa increased from 60 to 71.

## Types of wild rhino protection areas

The areas outlined below may not necessarily have any particular legal status. They may be established around natural populations, or around populations built up through translocation, reinforcement, or enhancement. In the following areas, wild rhinos are actively protected:

### Rhino conservation area (RCA)

Rhino conservation areas (RCAs) are defined as medium to large areas of natural habitat in which the natural patterns of rhino distribution cover the entire area. This area may be fenced or unfenced, and staff are deployed at

a moderate to high density specifically to protect the animals. Rhinos remain relatively unmanaged, except for ensuring adequate protection and translocating animals out of fenced areas once densities reach estimated maximum productive carrying capacity.

This approach is adopted for the largest natural populations of black and white rhino. Examples include Hluhluwe-Umfolozi Park and Kruger National Park in South Africa, which are both fenced RCAs, Ithala Game Reserve in South Africa, a partially-fenced RCA; and Masai Mara in Kenya, an unfenced RCA.

### Intensive rhino protection zone (IPZ)

An IPZ is a defined unfenced area on private or communal land, or within a larger State-run protected area, where law enforcement staff are deployed at a moderate to high density (ideally one field ranger between 10 and 30km<sup>2</sup>) specifically to protect rhino. The concentration of rhinos within an IPZ reflects natural patterns of distribution and movement and is not the deliberate result of fencing or other methods of confinement.

The key principle behind the IPZ is the concentration of anti-poaching effort in specific areas rather than spreading available resources inadequately over huge areas. Zimbabwe has set up IPZs at Sinamatella, Matobo, and Matusadona.

### Rhino sanctuary

A sanctuary is a small area of State-protected, private or communal land in which rhino are deliberately confined through perimeter fencing or other methods, and where law enforcement staff are deployed at a high density (one field ranger per 10–30km<sup>2</sup>) to protect the rhino population. The confinement of rhino within a sanctuary allows close observation and relatively intensive management of the population. As with the IPZ model, the sanctuary approach is based on the principle of concentrating law enforcement activity. Sanctuaries may be in range (as at Ngulia, Kenya) or out of range (as at Addo Elephant Park, South Africa), or, occasionally, a mix (as at Solio Ranch, Kenya, which has an in-range black rhino population and an out-of-range southern white rhino population).

### Rhino conservancy

A conservancy is a medium to large fenced area of private land, though possibly with some State-run protected land, in which rhino live on land units that are under the control of two or more landholders. Staff are deployed at a moderate to high density to protect and monitor the rhino population. Conservancies are ring-fenced and all internal fences have been removed to allow free movement of game within the Conservancy. In very large conservancies (e.g. Save Valley, Zimbabwe) the need for biological management is reduced. Conservancies such as Save Valley aim for the fusion of commercial and community-based

approaches under unified management obligations and policies that support conservation and attempt to counter poaching. In the Bubiana Conservancy in Zimbabwe, the black rhinos are flourishing even though the primary land use is not wildlife conservation but cattle ranching.

Similar to a rhino conservancy is the 'biosphere reserve' where land use patterns may differ between core conservation areas within the biosphere (the areas inhabited by rhinos) and buffer zones around them. The conservancy/biosphere reserve concept provides a model where government wildlife departments, commercial game farmers, and subsistence farmers can all cooperate to use large areas of land sustainably.

### Rhino ranch

A rhino ranch is a small to medium area of *private* land in which rhino are deliberately confined, through perimeter fencing or other methods, but where law enforcement effort or other human presence in the area is not oriented specifically towards rhino protection. This human presence might include labourers who daily check the fence-line, rhino monitors, eco-tourism staff, or wilderness trail operators. Because rhino-specific law enforcement effort is limited in these areas, these reserves do not qualify as rhino sanctuaries. However, the fence-lines of rhino ranches are usually regularly patrolled, and there may be sufficient human activity (associated with eco-tourism or legal hunting) to act as a deterrent to poachers.

A number of rhino ranches have implemented increased security measures and have been upgraded to the status of sanctuary.

### Outlying rhinos – non-intensive protection

'Outlying rhinos' (or 'outliers') are defined as solitary rhinos occurring in highly dispersed situations at very low densities outside an area where any form of protection is offered. As a result, rhinos will be under threat of illegal exploitation or habitat loss and may not be in regular breeding contact with other rhinos. Very small localised groups of rhino, such as the remaining western black rhinos in Cameroon, which occur in a very large area of suitable habitat, could be termed 'outliers.' Where pockets of small breeding groups of rhinos are found within vast areas (e.g. the Selous Game Reserve), it may be preferable to set up intensive protection zones where the rhinos live, rather than attempt to move them.

Solitary outliers that may not be in breeding contact with other rhinos are prime candidates for translocation to more secure situations where they will be in regular breeding contact with others. This has been Kenya's policy of dealing with any outliers which can be moved cost effectively. Remaining outliers in the Zambezi Valley in Zimbabwe were caught and moved to better protected populations

elsewhere. If these outliers had not been moved, they would surely have been poached, and Zimbabwe would have less than half the number of black rhinos it now has.

Sadly, the vast unfenced areas which held Africa's largest rhino populations, where law enforcement effort was spread thinly over large areas, have lost most, if not all, of their rhinos. Such areas include the Selous Game Reserve (Tanzania), the Zambezi Valley (Zimbabwe/Zambia), Luangwa Valley (Zambia), Chobe/Moremi (Botswana), northern Cameroon, Mozambique, and Tsavo National Park (Kenya). The few rhinos remaining in some of these areas have been reduced to the status of 'outliers.'

### Rhino management authorities, ownership, and reserve status

Table 3.5 shows that while the majority of African rhino (74%) are still conserved in State-run protected areas (8,219 rhinos), 23% are now either privately owned (2,145) or managed by the private sector on a custodianship basis on behalf of the State (395). Most privately managed black rhino are under custodianship agreements on behalf of the State whereas all privately managed white rhino are also privately owned. More black rhino than white rhino occur on communal land (172 compared to 16). Municipal or council reserves conserve a further 82 rhino.

While the majority of Africa's rhinos are still conserved by the State, private landowners in a number of the major rhino range states make an important contribution to rhino conservation. When rhinos were being heavily poached in Kenya and Zimbabwe, black rhinos fared better on private land, and without private sector conservation both these countries would have significantly fewer rhinos today. In South Africa the private sector owns just over 20% of the country's white rhino. Sales of surplus South African black and white rhinos to the private sector have also generated significant and much needed revenue for State conservation departments partially offsetting their declining government budgets.

### Black rhino populations

Of the 83 discrete black rhino populations in 1997, 45 occurred in State-protected areas. Of those that were privately managed, 23 were managed on a custodianship basis, while in one case, the rhinos lived in a State-protected area that is managed by the private sector. There were seven privately-owned black rhino populations in South Africa although all were small.

In Zimbabwe in 1997, more black rhinos were managed by the private sector on a custodianship basis (223) than were conserved in State-run protected areas (116). A further 171 black rhino were managed under custodianship in Kenya, Namibia, and Swaziland, and 62 were under private ownership in South Africa. In Namibia, Kenya,

Mozambique, and Tanzania, 167 black rhino occurred on communal land.

Of the 12 *key* black rhino populations in 1997, nine occurred in State-protected areas, two were privately managed on a custodianship basis, and one was on communal land. Of the 15 *important* black rhino populations in 1997, 11 were in State-protected areas, three were privately managed on a custodianship basis, and one was in a national reserve run by a county council. In 1998, following translocations to reduce densities, one *key* black rhino population was downgraded to an *important* population, while an additional *important* population was founded in a Zimbabwean Conservancy. This reduced the number of *key* populations to 11 and increased the number of *important* populations to 17.

### White rhino populations

In four of the white rhino range states (Botswana, Kenya, Namibia, and Swaziland) more white rhinos occur on privately owned or communal land than on land managed by the formal State conservation organisations.

In 1997, there were 248 discrete white rhino populations in Africa of which 184 were privately owned and 51 were in State-run protected areas. However, many of these privately owned white rhino populations were small with an average size of only 11 rhinos compared with an average of 123 animals in State-run protected areas.

Of the 11 AfRSG-rated *key* white rhino populations (in 1997 and 1998) seven occurred in State-protected

areas, one was in a single fenced area, which following the removal of boundary fences between private and State land, links a State-protected national park with a number of adjoining privately owned reserves. Of the 33 *important* white rhino populations, 19 are privately managed, and the remaining 14 occur in State-protected areas. Although many of the privately owned white rhino populations are small, half (22) of the *key* and *important* white rhino populations are privately owned and managed.

### The State/government conservation sector

Approximately three-quarters of Africa's rhinos are conserved on State land (see Table 3.5) in gazetted national parks, game reserves, and nature reserves, all of which are run by formal State conservation authorities. In some countries, for example South Africa and Tanzania, there are a number of different national conservation authorities, each of which is responsible for managing rhinos in its reserves and parks. However, in recent years, the proportion of rhinos living in State-protected areas has continued to decline as more rhinos are managed by the private sector on privately owned land.

State conservation authorities vary from being parastatals (a State organisation that is more autonomous than a government department) to fully-fledged government departments. The latter are usually entirely dependent on government funds, with any revenue earned

Species Subspecies	Black rhino					White rhino			ALL
	<i>D.b. bicornis</i> South-western	<i>D.b. longipes</i> Western	<i>D.b. michaeli</i> Eastern	<i>D.b. minor</i> South-central	All	<i>C.s. cottoni</i> Northern	<i>C.s. simum</i> Southern	All	
<b>Number of rhino</b>									
Communal	120		41	11	172		16	16	188
Defence Force					0		15	15	15
Municipal/county council			43		43		39	39	82
Privately owned	11			51	62		2,083	2,083	2,145
Private custodianship	48		113	233	394			0	394
State	562	10	284	1,068	1,924	25	6,270	6,295	8,219
State and privately owned					0		18	18	18
State owned but privately run			4		4			0	4
<b>TOTAL</b>	<b>741</b>	<b>10</b>	<b>485</b>	<b>1,363</b>	<b>2,599</b>	<b>25</b>	<b>8,441</b>	<b>8,466</b>	<b>11,065</b>
<b>% of rhino</b>									
Communal	16.2		8.4	0.8	6.6		0.2	0.2	1.7
Defence Force							0.2	0.2	0.1
Municipal			8.9		1.6		0.5	0.5	0.7
Privately owned	1.5			3.7	2.4		24.7	24.6	19.4
Private custodianship	6.5		23.3	17.1	15.1			0	3.6
State	75.8	100.0	58.6	78.4	74.0	100.0	74.3	74.4	74.3
State and privately owned							0.2	0.2	0.2
State owned but privately run			0.8		0.2			0	0.0

**Notes:**  
The table excludes speculative guesstimates and orphans that are not free-ranging. White rhino in the Kruger National Park are listed under State, while those resident in the adjoining three private nature reserves are listed as privately owned.  
Source: AfRSG data (1998)

being returned to Treasury. Parastatals rather than government departments have a strong incentive to generate as much revenue as possible from tourism, live sales, and hunting operations to help meet the high costs of successful conservation. Where parastatals receive little or no government funding, changing circumstances such as declining tourism can severely reduce conservation income.

## Private ownership

South Africa pioneered the private ownership of white rhino in the late 1960s. However, it was only in 1989 that the main supplier, the Natal Parks Board started selling its rhinos at market value. By 1997, a fifth of Africa's southern white rhino (1,785 out of 8,441) were conserved on 163 private reserves in South Africa. Ten years earlier, the figures were just 791 rhino on 80 private reserves. By 1997, Kenya, Namibia, and Zimbabwe had a combined total of 242 white rhino in private ownership. Kenya allows private ownership of southern white rhinos because the species is introduced.

The move to private ownership has increased the land area available to rhinos and increased the revenue of parastatal State parks boards (from the sale of rhinos) such as the KwaZulu-Natal Nature Conservation Service (formed from the amalgamation of the Natal Parks Board and the KwaZulu-Natal Department of Nature Conservation) and North West Parks Board (formerly Bophutatswana Parks Board) in South Africa.

## White rhino

In South Africa and Namibia, landowners may realise their investment in white rhino through tourism, live sales, and limited sport hunting of surplus bulls (and occasionally old females). In Kenya, however, private owners are restricted to non-consumptive use of white rhinos through tourism.

In 1997, three out of the 11 AfRSG-rated *key* white rhino populations and a further 18 of the 33 AfRSG-rated *important* white rhino populations were on private land. Of these, two *key* and nine *important* populations were on private land in South Africa, with Kenya holding the other *key* private population and Zimbabwe, Namibia, and Swaziland each having one *important* white population on private land. Surveys in 1994, 1996 and 1997 (Emslie *in litt.*, Buijs and Papenfus 1996, Buijs 1998, Buijs *in press*) found that numbers have continued to increase on private land since 1987 (Buys 1987).

In Kenya, Namibia, and Zimbabwe the private sector is allowed to own southern white rhinos, whereas the ultimate management authority for all black rhinos remains the State. A few white rhinos in Kenya are also looked after on a custodianship basis.

One of the world's most unusual privately-owned white rhino populations occurs in a fenced game reserve in South Africa where it forms the buffer area around an explosives factory.

## Black rhino

In 1990 in South Africa, the first black rhinos were sold by auction to approved buyers. In 1995, Namibia also sold black rhinos for conservation reasons to South Africa for the first time. While numbers of privately owned black rhino have grown, the total number is still small, accounting for only 2.4% of Africa's black rhinos in 1997. None of the AfRSG rated *key* and *important* populations in 1997 was privately owned.

## Private custodianship

A total of 394 (15%) black rhinos were managed by the private sector on a custodianship basis in 1995. This system has proved successful in both Kenya and Zimbabwe where, during past periods of heavy poaching, privately protected black rhinos fared better than those on State land.

In contrast to the pattern of white rhino management, many black rhinos are managed on a custodianship basis for the State on private land, mainly in Kenya, Zimbabwe, Swaziland, and Namibia.

In 1997, two of the 12 AfRSG-rated *key* populations of black rhino occurred in Zimbabwean conservancies. Of the 15 *important* black rhino populations, in 1997, three were custodianship populations on private land (one in Zimbabwe and two in Kenya, with one of the latter being on the borderline of being classified as a *key* population). In 1998, an additional *important* custodianship population was founded in a Zimbabwean conservancy.

## Communal land

In 1997, 6.6% of Africa's black rhino occurred on communal land compared with only 0.2% of Africa's white rhino. Since the late 1980s, black rhino numbers have declined markedly on the communal land where they used to occur. In 1997, 16% of south-western black rhinos and 8.5% of eastern black rhinos were conserved on communal land.

## Municipal/county council reserves

In South Africa, Kenya, and Tanzania there are a limited number of reserves and conservation areas run by local area or municipal authorities. The Masai-Mara National

Reserve in Kenya is run by the local Narok and Trans Mara county councils, while in Tanzania the Ngorongoro Conservation Area Authority manages the Ngorongoro Conservation Area and its surrounding area. South Africa also has a number of small municipally owned and managed parks which have a few white rhino. In 1997 such municipal/county council/local authority parks held 39 white rhino and 43 black rhino (about 0.7% of Africa's rhinos). All municipally managed black rhino are of the eastern subspecies and make up 8.9% of this subspecies in the wild.

### **Military bases and zoos**

In South Africa a small number of military bases have wildlife reserves containing a few white rhino. The contribution of these small reserves to total southern white rhino numbers however is very small (15 rhino on 5,000ha). Similarly, a small number of southern white rhinos (22) occur on 6,800ha of small zoo-owned nature reserves in South Africa.

# Rhinoceros Populations in Captivity

With declining budgets for field conservation, the long term ability of conservation agencies to protect and manage rhinos successfully in the wild is likely to be impaired unless increasing revenue can be generated. Captive populations potentially act as a safety net should field conservation effort fails.

While the AfRSG supports captive breeding of rhino, both in and out-of-range, it believes that out-of-range captive programmes and in-range wild rhino conservation should be evaluated as complementary and not competitive strategies. Captive breeding programmes should not detract effort and funds from conservation focused on wild rhino in areas of natural habitat.

Current population growth performance for the eastern black rhino and both subspecies of white rhino in captivity has been poor (Foose 1998, Stanley-Price 1993, Leader-Williams 1993). South-central black rhino have performed much better in captivity, probably because this population has been established more recently, is younger and has the full benefit of scientific management. The main problem with black rhino has been survival as the species reproduces relatively well in captivity. The problem with white rhino is the opposite, they have survived well but, with notable exceptions, have not reproduced in most captive facilities. It remains to be seen whether improved diets and husbandry, the development of more extensive paddock systems, combined with the application of results of reproduction research, will see captive rates of productivity that consistently approach levels obtained under protection in the wild.

Some captive breeding institutions world-wide such as those at London, Bronx (New York) and Adelaide play an important educational role in raising awareness of the plight of wild rhinos. The captive breeding community is also placing increasing emphasis on supporting rhino conservation efforts in the wild in Africa and Asia.

## Status and captive breeding performance

At the end of 1998 there were 948 African rhinos in captivity world-wide (Table 4.1). About 10% of the world's black rhinos, 8% of the world's southern white rhinos, and 35% of the world's northern white rhinos are in captivity.

While the total number of African rhinos in captivity now meets the target number set by the captive breeding community, this community is now seeking to increase the proportion of black rhinos in relation to the number of southern white rhinos. The targets to be achieved within the next 50 years are 400 black rhinos and 525 white rhinos (T. Foose *in litt.*). To some extent the reduction in the captive white rhino population will happen automatically as a very high proportion of them are currently over 25 years old. This trend is already apparent, with the captive population of southern whites declining by 18 animals and the captive black rhino population increasing by 11 between 1995 and 1997.

## Black rhinos in captivity

Only two of the four black rhino subspecies are represented in captivity. In 1995 three-quarters (180 animals) of these were eastern black rhinos (*D.b. michaeli*), while the remainder (60) were south-central black rhinos (*D.b. minor*). The single former Namibian south-western black rhino (*D.b. bicornis*) that spent a brief period in Lisbon Zoo has been returned to the wild in Augrabies Falls National Park in South Africa where she has since bred successfully.

In 1997, there were no captive populations of either the south-western black rhino (*D.b. bicornis*) or the central-western black rhino (*D.b. longipes*). There are no plans to start captive populations of these two subspecies.

Table 4.1. African rhinos in captivity world-wide by subspecies at the end of 1998.

	Numbers in captivity	Births 1993–98	Deaths 1993–98	Net change 1993–98
<i>D.b. michaeli</i> (Eastern black rhino)	175	65	63	+2
<i>D.b. minor</i> (South-central black rhino)	60	29	16	+13
<i>D.b. bicornis</i> (South-western black rhino)	0	–	–	–
<i>D.b. longipes</i> (Western black rhino)	0	–	–	–
<i>C.s. cottoni</i> (Northern white rhino)	9	0	0	0
<i>C.s. simum</i> (Southern white rhino)	704	100	106	–6

Source: T. Foose *in litt.* based on data from R. Göltenboth and A. Och (1999)

High mortality rates have been a major problem hampering the successful captive breeding of black rhinos. The major causes of death have been haemolytic anaemia, mucocutaneous ulcer disease, cholestatic hepatopathy, encephalomalacia, fungal pneumonia, leptospirosis and tuberculosis (Foose 1994, Miller 1994). In one survey of captive black rhinos, haemolytic anaemia accounted for 40% of all adult deaths (Miller 1994). Morbidity (illness) from mucocutaneous ulcer syndrome has also been very high (Miller 1994).

Research has revealed that the diseases may be related to the black rhino's unusual blood chemistry. For example, black rhinos have very low levels of particular enzymes in their red blood cells (Foose 1994, D. Paglia 1994, 1999).

There is also concern that the diets of captive black rhino have been deficient, which may have contributed to the poor *ex situ* breeding rates recorded. Research into improving captive black rhino diets and making them more similar to natural diets is being undertaken to redress this problem.

Against this background, the recent increase in numbers of south-central black rhino in North America is encouraging. However, the performance of the eastern black rhino in captivity there has failed to match this, with seven eastern births cancelling out seven deaths in the period 1995–97. The reason for this poorer performance may be that the eastern blacks are generally older than the south-central blacks, and were born well before the current advances in rhino research and husbandry techniques.

The world's captive population of south-central black rhino (*D.b. minor*) remained stable between 1982 and 1995, with 42 animals introduced at the start of the period and 42 remaining alive at the end (Foose 1996). The underlying trend was better if the six animals whose deaths were linked to exposure to creosote in bomas in Zimbabwe are excluded. The 36 other former South African and Zimbabwean founder black rhinos in captivity outside Africa therefore increased by six over the 13 year period. In North America, from 1995 to 1997, there were a further 13 births but only six deaths. The net increase of 13 south-central black rhino world-wide over the two years is particularly encouraging as this represents for the first time, a captive breeding growth rate equivalent to that of a rapidly expanding wild black rhino population. However, more progress is required to improve the husbandry of these animals. There also remains a number of reproductive physiology problems, such as the difficulty of artificial insemination. The International Rhino Foundation (IRF) is particularly active in funding such research and a core group of zoos is now achieving annual growth rates of 4%.

## Southern white rhino in captivity

Reproduction of the southern white rhino in captivity has occasionally been successful especially where a number of

animals, including more than one male, have been held in large enclosures that more closely simulate wild conditions. One cow at San Diego, for example, has produced 10 calves in captivity and since 1971, the 14 cows there have given birth to 75 calves (Reiches 1993). Southern white rhinos are also less prone to fatal diseases in captivity than black rhinos and, being grazers, are easier to feed than the browsing black rhino.

Despite these successes, the overall annual rates of increase obtained in captivity are still well below those of well-protected free-ranging populations. Table 4.1 shows that from 1993 to 1998, six more southern white rhino died than were born in captivity world-wide. This is in stark contrast to net population growth rates of 6.5% to 10% per year being achieved by well-protected wild populations held below ecological carrying capacity. At an attainable wild growth rate of 6.5% this would have resulted in an increase of 253 animals over the same period instead of a decline of eight. The global captive population has declined since 1996 and a negative annual growth rate of -3.5% per year has been estimated for the captive population of ageing southern white rhino in North America (AfRSG data 1998).

The problem is largely due to the fact that some zoos are primarily run as 'collections' and many white rhino in North America are to be found in non-breeding pairs in small enclosures. Young animals that grow up together in captivity may develop sibling relationships, and failure to breed is a common problem. On a positive note, an increasing number of zoos that only have space for a pair of rhinos are converting to species that do breed in pairs that have matured together, and are moving their white rhino to larger facilities (T. Foose, *in litt.*).

The Natal Parks Board exported 658 southern white rhinos to destinations outside Africa between 1962 and 1994. As there were only an estimated 646 southern white rhino in captivity in 1997, captive breeding programmes overall have failed to increase numbers. By comparison, the white rhinos reintroduced to Kruger National Park attained an average growth rate of 8.4% per year, representing a doubling of numbers every nine years. Similarly, the 20 animals taken to Kenya in the 1970s had increased in number three and a half times by 1992 (Brett 1993).

Studies of zoo populations of white rhino by Lindemann (1982) showed that the breeding success of populations of white rhino females with only one male was significantly lower than in populations with more than one male. As previously mentioned, pairs of rhino obtained as young animals that mature together in captivity usually do not breed but if the animals are moved to a new facility they may start breeding. It also appears that the larger the group the more successful the reproduction (Reece 1993).

However, some re-established wild populations of southern white rhino in a number of African range states, where law enforcement efforts were not sufficient to prevent

poaching, have performed worse than out-of-range zoos and safari parks.

### **Northern white rhino in captivity**

Captive reproduction of northern white rhinos has not yet been successful despite the efforts of the zoos involved. Currently, there are just nine northern white rhino left in two zoos: at Dvur Kralova in the Czech Republic and at San Diego in the USA. In 1984 there were 14 in captivity, giving a rate of decrease of 4% per year from 1983 to 1995 (Smith *et al.* 1995). The last birth in captivity was in 1989 (Smith *et al.* 1995).

Over the same period, numbers in the wild in Garamba National Park in the Democratic Republic of the Congo increased from 15 to 31, although following recent unrest, numbers have declined to 25. From 1983 to 1995 there were 24 births in Garamba (Smith *et al.* 1995), which contrasts markedly with the single birth among the captive northern white rhino in Dvur Kralova (Svitalsky *et al.* 1993). It was therefore fortunate that the 1983 proposal to remove all remaining northern white rhino from Garamba National Park to captive breeding establishments was rejected by the then Zairian government, which wished to conserve the remaining rhino *in situ* (Leader-Williams 1993).

### **Relative costs of captive programmes**

Looking after captive animals has always been more costly than protecting in-range wild rhinos (Leader-Williams 1993). Costs include public education and efforts to raise public awareness that result in better fund-raising opportunities. However, this difference in cost is narrowing (Foose 1996). Some captive breeding centres are developing more extensive 'paddock' systems which have lower maintenance costs than traditional zoos (e.g. The Wilds and White Oak in the USA), while the costs of developing and maintaining anti-poaching strategies to protect wild rhino are continually increasing (N. Leader-Williams, pers. comm.). It has been estimated that successfully managing and protecting a rhino sanctuary can cost as much as \$1,000 per km<sup>2</sup> per year (Dublin and Wilson 1998, Conway *in litt.*, Herbst and Emslie, *in litt.*).

### **Programmes to reintroduce rhinos to the wild**

A number of experiments are in progress to reintroduce captive-bred black rhino to the wild. One eastern black rhino from Britain, two south-central black rhino from Germany, one south-western black rhino from Portugal and another south-central black rhino from White Oak in the United States have been moved to protected areas in South Africa – Addo Elephant National Park, Marekele National Park and Augrabies National Park (T. Foose, *in litt.*). The captive breeding community hopes to translocate more south-central (and perhaps eastern black) rhino males with a view to improving the genetic diversity of the wild populations into which they are introduced (T. Foose, *in litt.*). However, experience shows that it would be preferable to introduce females that have the lowest mortality risk following translocation. Limited attempts to introduce males for genetic reasons have so far proved unsuccessful with the introduced animal either being killed or being forced to move into peripheral areas (RMG data). Other possibilities are being explored with sanctuaries in Tanzania and Uganda (T. Foose, *in litt.*).

### **Supporting field-based rhino conservation**

Several captive breeding institutions are directly supporting field-based rhino conservation efforts in the wild in both Africa and Asia. The International Rhino Foundation, an NGO, is involved in providing and supporting field rangers in Garamba National Park (home of the only known northern white rhino population in the wild). It is also making a major contribution to Sumatran rhino conservation through funding and operating field ranger patrols and has provided some support for the AfRSG Secretariat activities. Other key organisations involved in supporting wild rhino conservation include: the American Association of Zookeepers, The Zoological Society of London (ZSL), other UK zoos (through the Rhinos in Crisis Appeal), Frankfurt Zoological Society (FZS), and the Wildlife Conservation Society (WCS). All these organisations also help indirectly by developing and disseminating educational material to increase public awareness of the plight of the rhino.



# Conservation Status of African Rhinoceroses

## IUCN Red List Categories

The 1994 IUCN Categories of Threat have been used to classify the conservation status of all the species of the black and white rhinoceros (Baillie and Groombridge 1996). For a description of these categories, see Appendix I.

### Black rhinoceros (*Diceros bicornis*)

**Status:** Critically Endangered A1 a,b,c

**Grounds for species assessment:** Black rhino numbers have declined by over 80% over the last three generations (about 45 years) based on direct observation, an index of abundance appropriate for the taxon, and a decline in the area of occupancy and extent of occurrence. The four subspecies of black rhino are regarded as sufficiently distinct to warrant being listed separately, despite the focus of the *1996 IUCN Red List of Threatened Animals* being at the species level.

At a subspecies level, status within the **Threatened** category varies from **Critically Endangered** to **Vulnerable**:

*D.b. longipes* (Western)

**Critically Endangered** A1a, b,c, C1+2a, D

*D.b. michaeli* (Eastern)

**Critically Endangered** A1a,b,c

*D.b. minor* (South-central)

**Critically Endangered** A1a,b,c

*D.b. bicornis* (South-western)

**Vulnerable** D1

The fact that the south-western black rhino is rated in a lower category of threat than the more numerous south-central black rhino, or indeed than the species as a whole, highlights some problems with using the current IUCN criteria of threat for widely distributed, long-lived species. IUCN is currently undertaking a review of the Red List criteria, and developing criteria that can be used at a regional or national level.

### White rhino (*Ceratotherium simum*)

**Status:** Lower Risk – Conservation Dependent

**Grounds for species assessment:** The northern and southern white rhinos are also regarded as sufficiently distinct to warrant being listed separately, despite the focus of the

*1996 IUCN Red List of Threatened Animals* being at the species level.

### Northern white rhino (*C.s. cottoni*)

**Status:** Critically Endangered A1 a,b,c, D

**Grounds for species assessment:** Numbers of northern white rhino have declined by over 80% over the last three generations (about 45 years) based on direct observation, an index of abundance appropriate for the taxon, and a decline in the area of occupancy and extent of occurrence. There is only one population, of less than 30 individuals.

**Distribution:** Democratic Republic of the Congo

### Southern white rhino (*C.s. simum*)

**Status:** Lower Risk – Conservation Dependent

**Grounds for species assessment:** The southern white rhino does not qualify for inclusion in any of the threatened categories. Numbers have been increasing for over 100 years and in 1997 the subspecies numbered approximately 8,400 in the wild. However, the southern white rhino is the focus of continuing taxon-specific conservation programmes. At the time that this Red List status was assessed, the evaluators felt that the ending of these programmes and especially the high expenditure on protection, could result in the southern white rhino qualifying for one of the threatened categories within five years.

**Distribution:** Botswana, Namibia, South Africa, Swaziland, Zimbabwe. (NB. In Kenya, Zambia and Ivory Coast, introduced populations occur outside the subspecies' natural range.)

## CITES listing of African rhinoceroses

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975) (CITES) is an international treaty, signed by 145 countries, aimed at protecting wildlife and plant populations from decline through unsustainable international trade. It provides for the monitoring and regulation of trade in species listed in its appendices:

**Appendix I:** CITES prohibits international commercial trade in the species listed in this appendix.

**Appendix II:** International commercial trade in the species listed here is permitted if it is sustainable and the specimens are obtained legally.

With the exception of South Africa's populations of southern white rhino, which are all listed on Appendix II, (with an annotation regarding continued export of legal hunting trophies and live sales to approved and acceptable destinations), all other black and white rhino populations are currently listed on CITES Appendix I.

At the ninth Conference of the Parties of CITES held at Fort Lauderdale in 1994, a proposal to downlist South

Africa's southern white rhino was passed by a significant majority (66 in favour, 2 against). The downlisting applies only for trade in live animals to "approved and acceptable" destinations,<sup>1</sup> and for the (continued) export of legal hunting trophies.<sup>2</sup> At the 10th Conference of the Parties to CITES held at Harare in 1997, a proposal by South Africa to downlist its southern white rhino population to allow for a limited trade in southern white rhino horn with an initial zero quota (i.e. no trade allowed until a positive quota is approved at a future Conference of the Parties) did not get the necessary two thirds votes.

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<sup>1</sup> In determining whether a destination is 'acceptable', South African conservation authorities will only issue permits to allow the export of live white rhino once the importing country's CITES management authority has indicated the proposed use of the animals, as well as giving its support to the proposed importation of white rhino. The rationale behind this down listing was that live sales abroad would generate much needed additional revenue which could be used to help meet the high costs of successful rhino conservation.

<sup>2</sup> In South Africa, sport hunting of surplus mature white rhino bulls (and occasionally old females) began in earnest in 1968. The export of hunting trophies is therefore not a new development, has clearly been sustainable, and has brought benefits to rhino conservation and to the host country and its people (Adcock and Emslie 1994).

# Threats to Rhinoceroses

Over the centuries, all species of rhino have been shot as ‘vermin’, as hunting trophies, and for their meat. They have been cleared from land destined for human settlement and their habitats have been degraded through land management practices and human encroachment. Rhino skin has been used for shields and good luck charms, and even blood, urine, bones, and dung have been used in traditional medicines and potions to reduce fevers, headaches and other illnesses (Martin and Martin 1982, Leader-Williams 1992). Without doubt, demand for rhino horn has been primarily responsible for the catastrophic decline in rhino numbers, particularly in the second half of the 20th century. Despite international legislation and domestic bans on trade in rhino horn, the lure of seemingly easy money to be made by poaching means that rhinos are always under threat.

This chapter examines the **external** threats to rhinos – the demand for their horn from Asia and the Middle East – and the **internal** threats that arise in their range states. The latter include wars, poverty, rising rhino protection costs, declining conservation budgets, varying attitudes of politicians and local communities to conservation, and land claims. Internal threats rarely kill rhinos directly; instead they provide opportunities for poachers to kill rhinos for their horn with little chance of being caught, or they draw more people into poaching through financial desperation. Reduced budgets can prevent the sufficiently concentrated deployment of field rangers needed to effectively monitor and protect rhinos. Additionally, a lack of resources can preclude good biological management resulting in reduced population growth rates. The results can be similar to poaching – fewer rhinos.

## The external threat: the international rhino horn trade

It is a simple but undeniable fact that if there was no demand for rhino horn, there would be little or no rhino poaching. Controlling the illegal supply of horn through anti-poaching measures is a very expensive strategy, and its long term effectiveness is threatened by declining budgets. It is important to discover what drives the rhino horn trade, and examine the potential for reducing illegal demand. If illegal demand could be reduced, the black market value of rhino horn may drop, poaching pressure may decline, and the costs of successfully protecting rhino populations in the wild might also decline.

## Rhino horn – the cause of the problem

The two main uses of rhino horn are *medicinal* – as an ingredient in traditional Chinese medicine (TCM), and *ornamental* – as a highly prized material for making handles of jambiyas (ceremonial curved daggers worn in some Middle East countries). In the first category, it is the perceived pharmacological properties of the horn that are important; and in the second, it is the physical properties that make rhino horn jambiyas so sought-after.

Rhino horn is made of keratin and is similar to compressed hair and fingernails. Towards the base of the horn, horn can fray on the outside giving a coarse, hairy appearance revealing individual filaments of horn. Higher up, the outside of the horn is worn smooth. If a piece is cut from the middle of a rhino horn, and held up to the light, it has a translucent amber glow. In contrast, horn tips are compressed, almost black, and very hard. In general white rhino horns are slightly bigger and thicker than black rhino horns, and a pair of white rhino horns can weigh as much as 6kg. The world record white rhino trophy horns measured 158.8cm and 133.4cm respectively for the front and back horn (Player 1972). The front horn of the white rhino has a square base compared to the more rounded base of a black rhino horn.

Rhino horn continually grows during the animal’s life, although it is also continuously being worn down through rubbing. The rate of growth of new horn varies according to the species, sex and age of the animal, its behaviour and environment. Average rates of regrowth can be as high as 5cm per year (Pienaar *et al.* 1991). Thus, horns continue to grow back on dehorned animals, requiring regular trimming to reduce potential gains to poachers. This constant growth, also makes it possible to farm rhino horn by harvesting it at repeated intervals during the rhinos’ life. Although rhino horn is dead material, great care must be taken when dehorning, not to cut horn too close to the bases on the skull, to avoid cutting into nerves and blood vessels.

African rhino horns are bigger than the horns of the three Asian rhino species. In Taiwan, most pharmacists indicated that they felt Asian or “fire” horn was more powerful and effective than African “water” horn, and that “fire” horn was more likely to be used for serious illnesses or emergencies. In Taiwan, stocks of African horn were estimated to be 29 times greater than those of Asian horn. As a result of its greater rarity and perceived superior pharmacological properties, Asian horn sells at a premium. Different survey techniques used in Taiwan in

1991 indicated that the retail price of “fire” horn was between five and nine times greater than “water” horn (Nowell *et al.* 1992).

The chemical composition of horn is influenced by the diets of rhinos (Lee-Thorp *et al.* 1992, Hall-Martin *et al.* 1993, Hart *et al.* 1994, Emslie 1999b) and this is now being used to help identify the source of rhino horn – i.e. rhino horn fingerprinting (see later section on horn fingerprinting, page 68). As part of a major WWF sponsored project, the AfRSG is developing a continental horn fingerprinting database, and a forensic technique that can be used to help wildlife investigators and endangered wildlife police units determine the species and probable source of illegal horn obtained in raids (Emslie *et al.* in prep).

## Traditional Chinese medicine (TCM) and the rhino horn trade

In the West, the idea has persisted that rhino horn is used primarily as an aphrodisiac – a mistaken and ignorant view perpetuated by the world’s media. Historically, only in Gujarat and a few locations further north in India has rhino horn been known to be used in this way (Martin and Martin 1982, Martin 1983). The work of Esmond Martin however indicates that in response to domestic bans and increasing prices, domestic consumption of horn as an aphrodisiac seems largely to have ceased in India (Leader-Williams 1992). Instead, one of its main uses has been medicinal, primarily used as a fever reducer (Zhang 1990, Nowell *et al.* 1992).

Rhino horn has been one of the most revered ingredients in the pharmacopoeia of traditional Chinese medicine (TCM) for centuries (Mills 1997), and is listed in an ancient Chinese pharmacology text, ‘The Divine Peasant’s Herbal’, written about 2,000 years ago (Nowell *et al.* 1992). Rhino horn has been used to treat a wide range of illnesses and conditions including high fevers, influenza, poisoning, convulsions, typhoid, epilepsy, restlessness,

jaundice, malignant swelling, abscesses, hepatitis, leukaemia, haemorrhages, rhinitis, cerebrovascular diseases, severe external burns, and as a general tonic (Nowell *et al.* 1992). A number of TCM practitioners do not believe there is a suitable substitute for rhino horn in certain cases (Ching-Hwei 1991). One of the difficulties in reducing demand for rhino horn in Asia is that it is not used to make luxury items, but rather is seen as having valuable medical properties, and is perceived by some as a life-saving ingredient (T. Milliken *in litt.*).

Clinical trials to determine whether there is a pharmacological basis for the belief in the fever-reducing properties of rhino horn have so far proved inconclusive. A recent clinical study using rabbits established that rhino horn did not have any significant fever reducing properties (Laburn and Mitchell 1997). However another study (But *et al.* 1990) demonstrated some cooling effect on fever when massive doses of horn were given to rats.

Medicinal rhino horn sold in East Asia is usually dispensed in two very different ways. It is either sold ‘raw’ by traditional pharmacists who make up the medicines (usually by scraping fragments from pieces of horn), or as an ingredient in manufactured medicines in the form of pills or ‘medicine balls,’ and tonics (Mills 1997, Milliken *et al.* 1993).

## The TCM community perspective

In a bid to explore the sociological and cultural underpinnings of rhino horn usage in TCM, TRAFFIC (Trade Records Analysis on Flora and Fauna in Commerce, the wildlife trade monitoring network of WWF and IUCN) organised a workshop in Taiwan in 1992 which, for the first time, brought together TCM practitioners, government regulators, and conservationists. This was followed in 1995 by a TRAFFIC-sponsored symposium that was convened and attended by TCM delegates from China, Hong Kong, Singapore, South Korea, and Japan, and by academics, government officials, and conservationists. Delegates made it clear that the West should not seek to legislate on moral/health care choices, and cited the “insulting propensity of Westerners to claim that the primary use of rhino horn is as an aphrodisiac”. The TCM community felt it was being coerced into giving up rhino horn, and it condemned the burning of horn stocks as ‘offensive’ with some practitioners feeling that bans on life-saving medicines ‘forced’ them into breaking the law. They believed that imposition of bans on the import and use of rhino horn had simply led to profiteering and black-market trading. At the same time however, the discussions highlighted a lack of understanding on the part of the TCM community about the plight of the rhino and other endangered species, with many delegates believing that the impact of traditional medicine on wildlife was minor or inconsequential (Mills 1996).

A range of traditional Chinese medicines containing rhino horn.



WWF-Canon/Esmond B. Martin

The outcomes of the symposium were positive. The conservationists acknowledged the strong cultural attachment to traditional medicine in the East and the need for greater cultural sensitivity while the TCM community expressed a willingness to explore ways of limiting their use of medicinal products from endangered species and, in the long term, of supporting captive breeding and farming programmes. These are amongst the reasons why some conservationists see dialogue and cooperation with TCM practitioners – particularly a more culturally sensitive approach – as the key to reducing the demand for rhino horn. The challenge for the future lies in progressing on a basis of mutual respect and in enlisting the TCM community as a positive force in protecting the rhino and other endangered species.

### **The manufacture and levels of consumption of rhino horn medicines**

Law enforcement seizures world-wide indicate that the majority of manufactured medicines containing or purporting to contain rhino horn are produced in China (Mills 1997). Research by Esmond Martin and TRAFFIC (Milliken 1994) shows that in 1994 the principal consuming nations were mainland China, Taiwan, and South Korea, although manufactured medicines were also being exported to sizeable expatriate Chinese communities around the world (Milliken *et al.* 1993, Milliken 1994). Hong Kong and, more recently, Singapore have acted as major holding centres for rhino horn.

Martin (1990) estimates that, in the late 1980s, about 600–700kg of rhino horn was being used in China each year, and between 1982 and 1986 China imported about 2,000kg annually. In 1998, a registration of rhino stocks in Chinese medicine corporations alone (excluding retail shops, museums, and private ownership) recorded total holdings of almost 10,000kg of horn (Leader-Williams 1992).

In Taiwan in 1991, stocks of African horn in licensed pharmacies totalled 3,735kg, although total stocks based on the estimated number of pharmacies were estimated at 9,015kg. However, further unpublished work by Nowell and her colleagues showed Taiwan's pharmacists and doctors prescribed and sold on average around 45g of rhino horn annually and when multiplied by the total number of pharmacies and clinics selling horn, this suggests the consumption of a total of only 486kg annually. This apparent 'oversupply' and the large stocks of horn that have been documented in a number of TCM markets, and the continued availability of horn in China despite apparent declining prices and demand can be explained partly by the fact that horn used in TCM is prescribed in very small quantities. A traditional dose (or *chien*) may be as little as 3.75g (Nowell *et al.* 1992).

If the TCM practitioners primarily bought rhino horn to make a quick and immediate profit on it, economic

considerations would dictate that they should sell as much horn as possible to recoup their investment in the shortest possible time. However, as previously indicated, TRAFFIC found that annual sales volumes were very small in Taiwan, and TCM practitioners would take on average about seven years to recoup their capital investment in one kilogram of African horn, taking up to 20 years to use a kilogram (Milliken *et al.* 1993).

### **The impact of domestic and international bans on rhino horn usage in TCM**

Rhinos were among the first species to be included on the CITES Appendices. In July 1975 the three Asian rhino species and the northern white rhino were placed on Appendix I and the black rhino was placed on Appendix II. In February 1977, both the black and southern white rhino were placed on Appendix I (N. Leader-Williams 1992). Thus, from 1977, all five rhino species (and their products) were listed on CITES Appendix I, and all international commercial trade in rhinos and their products was prohibited. The continued export, under CITES permits, of legally hunted white rhino trophies was, however, allowed.

Law enforcement action and surveys indicate that trade in rhino horn medicines continues, whether motivated by profit and/or a devotion to ancient health care remedies, despite an almost world-wide ban on commercial international and internal trade (Mills 1997). Leader-Williams (1992) concluded that CITES and other efforts may have succeeded in slowing but not halting the rhino horn trade for medicines in the Far East.

The massive decline in black rhino numbers that has occurred despite the species' inclusion in Appendix I clearly shows that international trade bans under CITES alone have been ineffective.

Following international pressure, consumer countries have passed internal legislation banning the trade in rhino horn. In 1993, for example, the State Council of the Peoples' Republic of China issued a ban on the trade in rhino horn which included removal of rhino horn medicines from the official pharmacopoeia of China, and placed a ban on the manufacturing and commercial sale of rhino horn medicines. However, undercover Chinese investigators working for TRAFFIC in three surveys between 1994 and 1996 saw rhino horn or powder in 11.4% of businesses with TCM dispensaries and 14.8% of medicine markets surveyed. Most of the merchants holding supplies of raw horn claimed that it was old stock and that new horn was not available (Mills 1997). Whereas previously the TCM community had cooperated in market surveys concerning their usage of rhino horn, now any such admission of selling or possessing horn is tantamount to admission of a serious crime. South Korea's crackdown on the sale of rhino horn, for example, has driven horn out of the shop windows and into back rooms (Mills 1993). Monitoring trends in rhino

horn usage has therefore become much more problematic. In 1995 the Chinese government decided to allow 'existing' stocks of medicines containing rhino horn to be used in hospitals (Mills 1997).

### Carved rhino horn dagger handles in Yemen and Oman

From as early as AD618, the Chinese are known to have used rhino horn to make bowls, cups, and carvings (Martin and Martin 1982). Rhino horn drinking-cups have also been prized for centuries because of their poison-detecting properties (the alkaloids present in some poisons react strongly with the keratin and gelatine in the horn). However, the most extensive and enduring ornamental use of rhino horn is in the manufacture of dagger handles in a number of Middle East countries, particularly Yemen and Oman.

The most valuable daggers (jambiyas) are those with handles carved from rhino horn – they carry the greatest cultural significance and instill the wearer with the highest status (Martin *et al.* 1997). Unlike cheaper materials (e.g. water buffalo horn and camel nail), carved rhino horn has an amber translucency and after being handled over many years develops a special patina (called sayfani) while remaining durable (Martin *et al.* 1997). It is these qualities and properties of rhino horn that are considered beautiful and inspire the craftsmen, not simply any fascination with

the rhinoceros (Varisco 1987, 1989). It also explains why old and much handled horn jambiyas are especially prized and fetch significantly higher prices than jambiyas made from fresh horn (Martin *et al.* 1997).

### The demand for rhino horn in Yemen

During the 1970s, the burgeoning of oil-based economies in the Middle East led to a particularly strong demand for rhino horn jambiyas in a number of countries. With the ending of an eight year civil war in 1970 and the increase in Middle East oil prices, many Yemeni men found themselves, often for the first time, in a position to buy prestigious jambiyas with rhino horn handles (Martin *et al.* 1997). At the peak of the trade in the mid-1970s, about 40% of the rhino horn entering the world market ended up in North Yemen. Far more horn was consumed in North Yemen than in any other nation in the world at this time (Martin *et al.* 1997). One Yemeni trader claimed that he imported a total of 36,700kg of horn over the period 1970–1986, representing at least 12,750 African rhino deaths (Martin 1984, 1985, 1987, Vigne and Martin 1987a,b, 1991, Leader-Williams 1992). The main merchant in Sana'a, the capital of North Yemen, imported 3,000kg of rhino horn a year during the 1970s. From this he produced approximately 6,000 rhino horn dagger handles annually (Leader-Williams 1992). About five handles can be made from a 2kg horn, and the larger front horns of African rhino are preferred as there is less wastage, so these horns fetch higher prices (Martin *et al.* 1997).

As demand for rhino horn jambiyas soared, so prices escalated sixteen-fold over a decade. The poaching of rhinos for their horns suddenly became an even more attractive economic pursuit than before. As in the TCM community, awareness in North Yemen about the impact of the rhino horn trade on rhino conservation was virtually nil. Eventually, campaigns initiated by international NGOs led to a ministerial decree in 1982 banning the importation of rhino horn into Yemen. Five years later another ministerial decree prohibited the re-export of rhino horn shavings and chippings (the waste remnants from jambiya manufacture) to East Asian markets. A fatwa (an Islamic edict) was also issued by the Grand Mufti in Yemen stating that the killing of rhinoceroses to make dagger handles was against the will of Islam (Martin *et al.* 1997). This, coupled with a downturn in the Yemeni economy following the unification of North and South Yemen, and the Gulf War, saw horn imports decline substantially between 1982 and 1985, a trend that continued through the 1990s. Production of jambiyas fell to almost a third of 1970s levels, mainly as a result of the decline in rhino horn supplies on the world market (Martin *et al.* 1997).

Today, a larger proportion of dagger handles are made from cheaper alternative materials such as water buffalo horn, although these substitutes are considered to be of inferior quality compared to rhino horn. Agate and jasper

Antique jambiya with its rhino horn handle, North Yemen.



WWF/E.B. Martin

have recently emerged as acceptable, but much more expensive, high quality alternatives (Martin and Vigne 1995).

Yemen became a party to CITES in 1997. Nevertheless a limited number of rhino horn dagger handles are still being carved in Yemen, and at the time of writing, the authorities are still not strictly enforcing the ban on horn carving (Martin *et al.* 1997).

### **The dynamics of the rhino horn trade, 1970s–1990s**

In the 1970s and 1980s, the number of Sumatran and Javan rhinos declined sharply, and the price of Asian horn escalated. It appears that traditional medicine practitioners in some countries began turning to cheaper African horn during this period, thereby increasing the poaching pressure on rhinos in Africa. The 1970s was also a decade of rising demand for jambiyas in Yemen, which again compounded the threats to African rhino survival.

Between 1992 and 1995, numbers of black rhino in Africa appeared to stabilise at between 2,400 and 2,500 (with continued rapid increases in South Africa and Namibia primarily cancelling out declines in a number of other range states), before showing a slight increase to almost 2,600 in 1997. Numbers of southern white rhino also continued their steady increase throughout this period. Since 1996, levels of poaching have also declined in most range states, and, with some exceptions, the price of horn has fallen (Mills 1997) or remained stable (E. Martin, pers. comm.). There are a number of theories that could explain these trends.

One theory focuses on a possible decline in demand for horn from both TCM practitioners, and for making jambiya handles. It has been argued that illegal trade in endangered species can only be adequately controlled if international protection is supported by effective domestic legislative prohibitions. Without legislation prohibiting the possession and trading of horn in user countries, any horn smuggled into a country becomes, *de facto*, a legalised product. Increasing restrictive internal legislation and law enforcement efforts in Asia may have dissuaded some medicinal practitioners from buying or prescribing horn. The threats of sanctions and consumer boycotts against horn-using countries may have further encouraged governments to better implement internal trade restrictions. The results of undercover work by TRAFFIC in Taiwan (Nowell *et al.* 1992) and elsewhere, resulted in lobbying by WWF(US) and other NGOs against user countries. They also led to the unprecedented decision in August 1994, by the US Government, to impose limited trade sanctions against Taiwan under the Pelly Amendment, because of Taiwan's failure to stop its illegal tiger bone and rhino horn trade.

According to a survey of merchants in possession of raw horn, prices were lower in Asia because of the 1993 ban on rhino horn usage in China. TRAFFIC surveys in China from 1994 to 1996 suggest that the number of manufactured medicines containing water buffalo or saiga antelope horn as substitutes for rhino horn had also increased. In China, prices appeared to fall between 1994 and 1996, and some rhino horn sellers attributed this to falling demand. Internal trade bans therefore appear to be reducing demand (Mills 1997).

The critical factors remain the extent to which such legislation can be enforced, and what impact it will have on demand for horn. The role of legislation in reducing the demand for horn (thereby reducing poaching) is still being monitored.

A second theory developed to explain the recent encouraging trends in African rhino numbers and apparent reductions in poaching, is that they are largely due to improved protection and management of a greater proportion of rhino. Following heavy poaching, all the large under-protected populations of rhino that used to roam vast areas have now either been eliminated or reduced to a level where there are now only a few remaining outliers. Attempts are being made to catch the remaining animals in these areas and move them to safer areas where they can be better protected. As a result, more rhinos are now conserved in smaller areas where law enforcement can be concentrated at effective levels, making poaching more difficult. In recent years efforts have also been made to improve the quality and effectiveness of law enforcement activities in many of these protected areas.

Wildlife investigators however indicate that there is still interest in rhino horn, and potential criminals may be deterred from poaching rhinos through the perception that they are likely to be caught and convicted. Opportunist criminals and potential rhino poachers may simply have turned their attention to easier and safer ways of making money. In many areas increasing efforts are being made to use conservation as a vehicle to empower communities surrounding wildlife areas, and this may have also contributed to a reduction in poaching. Finally, ground-based rhino monitoring efforts have increased in the 1990s, and these are thought to contribute to security, as well as providing improved population performance data. The latter has helped guide biological management decision-making, and has contributed to maintaining high metapopulation growth rates in some regions.

### **Speculative stockpiling by investors in the Far East**

In the late 1980s and early 1990s, consumption levels in the major horn consumer markets appeared to be less than the amount of horn leaving Africa. This led to the theory that some horn wholesalers and middlemen may have been stockpiling rhino horn as a speculative investment. Such



Peter Jackson

Black rhino horns, Zambia.

activity may have been based on the assumption that, as rhinos became rarer (or extinct), supplies of horn would decrease allowing massive increases in the price of existing illegal horn stocks. A more likely motivating factor, however, was short term opportunistic buying.

### The black market and the price of rhino horn

Traditional Chinese medicine practitioners are rarely involved in the direct importation of horn, so they have been forced to rely on black market importers and suppliers in obtaining stocks, often at inflated prices (Nowell *et al.* 1992). The local wholesalers and middlemen make the greatest short-term profits (Milliken *et al.* 1993).

Given the media's emphasis on plummeting rhino numbers and the high retail value of horn, it is perhaps understandable why TCM practitioners have been prepared to pay such high prices for horn. Economists argue that when a trade is illegal, markets tend to over-react and may take longer to adjust. Prices can then rise and stay higher for longer than they would in a legal market where information on pricing and sales is readily available (t'Sas-Rolfes 1998).

Conservationists are concerned about a false perception being created in Africa of the value of African horn, by regular inaccurate or misleading media reporting of grossly inflated end-market Asian horn values. They fear this may stimulate additional small-scale poaching in the field or speculative dealing in Africa by opportunistic criminals. These people may simply be unaware of the much lower value of African horn, and that prices lower down the

black-market chain can be as little as one-hundredth of the final price on the Asian market (Milliken *et al.* 1993). During the first round of exchanges between a poaching gang leader and a Lusaka middleman in 1992, individual rhino horns were purchased for the equivalent of between US\$100 and US\$360 in local currency. These horns could have been bought later for about double that amount by a middleman in Johannesburg (Milliken *et al.* 1993). In another case, the poacher and local guide were each paid about US\$135 in local currency for horn while the local dealer was paid about US\$625 (C. Stockil, pers. comm.). South African police dockets indicate the local black market value of horn was Rand 7,530 (US\$1,215) per kilogramme (Swanepoel 1996). This figure may involve horn sold during police undercover operations and may be higher than the true local black-market value. This is only a fraction of the value of live rhinos that in local auction sales fetch approximately US\$21,700 (white) to US\$26,670 (black) each.

### Trade bans

The issue of trade bans is one of the most controversial in the field of rhino conservation. Some see trade bans as a threat while others believe they are essential to the future of the rhino and the pros and cons need to be carefully evaluated. The issue is discussed in more detail in chapter 9.

Trade bans may encourage black-market trading, thereby inflating horn prices and possibly stimulating demand. Trade bans also reduce opportunities for parastatal government conservation departments and the private sector to capture much needed revenue, reducing their ability and incentives to successfully conserve rhinos. This in turn is likely to result in a lower total white rhino carrying capacity, through reduced incentives for private sector ownership, with the result that surplus white rhino may have to be culled sooner rather than later (Emslie, in press.). Trade bans have meant that illegal horn has generally been obtained unsustainably by the killing of rhinos by poachers. However, if trade were legalised, horn could be supplied without killing rhinos using the significant legal stockpiles in some range states, horns recovered from natural deaths in the wild, and by routinely harvesting horn from live rhino.

Conversely, if demand for horn can be effectively reduced by the combination of international and internal trade bans, this will reduce the pressure on rhino populations in the field, thus reducing the level of expenditure needed to maintain and protect existing wild rhino populations. It has been argued that trade bans may finally be reducing demand and prices for illegal horn in consumer countries, and that this strategy should be given more time to prove itself. There is also concern over whether it is possible to establish sufficient and effective



anti-horn laundering controls at all stages of trade and not put other taxa of rhinos in other range states at risk. Concern has also been expressed about the adequacy of the control and registration of horn stocks in South Africa, especially those in the private sector.

Before CITES is ever likely to approve any reopening of a rhino horn trade, the international conservation community will need to be convinced of the benefits of trade, the likelihood of control mechanisms working, and especially that other taxa of rhinos in other range states will not be put at risk by such a move.

## The internal threats

The end-users of rhino horn – the TCM practitioners and the jambiya craftsmen generate the demand; the poachers supply the goods. The internal threats to the rhino relate directly to poaching and to the enabling or motivating conditions prevailing in range states. The latter influence the perceived cost-benefits to potential rhino poachers.

### Civil war, political instability, poverty, corruption and land tenure

Civil unrest and the free flow of weapons in Africa have had a significant negative impact on conservation efforts. Almost 70 per cent of the northern white rhino population was killed during the 1960s and 1970s as poaching went unchecked amid civil wars. Rhino populations in Angola, Central African Republic, Chad, the Democratic Republic of the Congo, Mozambique, Namibia, Rwanda, Somalia, Sudan, and Uganda have all suffered from the consequences of war and civil unrest since the 1960s. The decimation of Uganda's black rhinos, for example, coincided with the political instability prevalent in the 1970s. In Angola, UNITA troops traded rhino horn and ivory for weapons with South African Defence Force senior personnel, thereby contributing to the almost complete annihilation of rhino in southern Angola. It also appears that authorities in the former apartheid regime in South Africa turned a blind eye to ivory and horn smuggling from the rest of Africa through South Africa, as the smugglers provided valuable military intelligence information (Potgieter 1995).

Growing poverty in many African countries has often been associated with war and civil unrest. In the Democratic Republic of the Congo (formerly Zaïre), the World Bank estimates that per capita Gross Domestic Product (GDP) declined by more than 40% between 1965 and 1997. By 1994 the country's economy had shrunk to its 1958 level, while its population had tripled. Hyperinflation in Zaïre reached 9,800% in 1994, wiping out savings and slashing public sector salaries. Corruption was endemic and an

underground economy took over in which poaching played a role.

This picture of economies and societies in crisis is repeated across Africa, with newly independent governments finding themselves with growing human populations, diminishing financial resources, and an urgent need to place social development at the top of a long list of priorities. Consequently, wildlife departments have become increasingly short of funds and are unable to counter the opportunistic poaching by individuals and professional gangs. The combination of diminishing resources, poor political support, and corruption sent morale and effectiveness plummeting. During the 1970s and 1980s many rhinos were poached by the very people employed to protect them. Sadly, much of Africa is still plagued by corruption, stimulated by widespread poverty, and in some areas, a culture of self-enrichment among government officials persists. Problems have also occurred in some states where high level political pressure and influence has made it difficult for corrupt individuals to be removed from wildlife departments.

Even without war and unrest, over-valued African currencies and restrictive foreign exchange controls have had a similar impact on conservation efforts (t'Sas-Rolfes 1995). As economies fall into decline and turmoil, one of

Skulls of black rhino poached in Zambia.



Peter Jackson



Dead rhino found with its horn removed, Kenya.

Peter Jackson

the few ways people can obtain cash to buy consumer goods and to supplement their meagre salaries is through the lucrative illegal trade in wildlife, especially rhino horn. While most of the profit from this trade reaches the pockets of a few traders and middlemen, even the small amounts earned by poachers are incentive enough to risk fines, imprisonment or death.

The presence of professional, well-armed poaching gangs, which are prepared to cross international boundaries in search of rhinos, has been a cause of great concern to conservationists for many years. Sudanese poachers were allegedly responsible for wiping out the Central African Republic's rhinos in the 1970s; Somalis were heavily involved with rhino and elephant poaching in Kenya; and members of South Africa's military forces plundered the wildlife resources of Mozambique and Angola (AfRSG data). In the mid-1980s, Zimbabwe launched military-style operations in an attempt to stem the cross-border activities of Zambian-based poachers in the Zambezi Valley (Milliken *et al.* 1993). However in the above cases, the poached rhinos lived in large expanses of land where it was not possible to deploy anti-poaching personnel at a sufficiently high concentration to be effective.

Fortunately, most remaining rhinos now occur in smaller, better protected sanctuaries, intensive protection areas and rhino conservation areas. Whether significant poaching occurs will, to a large extent, depend on a trade-off between the continuing demand and the prices paid for illegal horn on the one hand (benefits), with the quality and level of field rhino protection and effectiveness of the local criminal justice system on the other hand (costs). To keep poaching to manageable low levels, 'costs' to poachers should be kept high and their potential 'benefits' reduced.

The use of vast tracts of land for wildlife conservation is under continued threat in Africa from increasing demand for more land for subsistence farming. With growing populations and increasing unemployment, land 'hunger' increases each year. For conservation in Africa to survive this pressure into the future, it has been argued that conservation needs to demonstrate that it can benefit and empower local communities. Conservation must be viewed by neighbouring communities as a sound form of land-use, not simply as a luxury where animals are protected for rich tourists to enjoy at the expense of local people living next to conservation areas.

Some African conservation areas were created in the past by the forced removal of people, resulting in several land claims against all or parts of a number of conservation areas. In South Africa numerous claims have been filed in the country's land claims court, and even if some of these claims may be spurious, while land claims remain unsettled, any tourist development or upgrading of conservation infrastructure is effectively halted. In Zimbabwe, the government has also indicated a desire to forcibly expropriate a number of farms (some of which currently conserve rhinos) for resettlement purposes.

Fortunately, resource economists in southern Africa have been able to demonstrate that in many semi-arid areas such as Madikwe in South Africa (Setplan 1991, Davies 1997) or Save Valley Conservancy in the lowveld of Zimbabwe (Anon 1994b), conservation provides the best potential economic return with significantly greater potential to empower and develop local communities than subsistence agriculture and cattle ranching. This work has helped influence attitudes more favourably towards conservation. In a number of cases in South Africa, local

communities have indicated that even if they win their land claim, they do not wish to change land use, but simply wish to share in the economic benefits of continued conservation in their area.

## Declining government resources for rhino conservation

It is a sad fact that in large open areas, where funding and staffing levels were very low, rhinos have already been largely poached out of existence. Range state conservation departments have already, or are increasingly looking to consolidate rhinos into manageable areas where patrol effort can be concentrated and where poachers run a high risk of detection and/or capture.

With a strong relationship that has been demonstrated between successful field conservation of rhinos and the levels of budgets and field effort (Leader-Williams *et al.* in prep), it is clear that declining budgets and a lack of government commitment to conservation pose a major threat to rhino.

In South Africa, for example, it has been estimated that a park of 500km<sup>2</sup> needs to spend about US\$1,000/km<sup>2</sup> per year to keep poaching in check (Conway *in litt.*, Herbst and Emslie *in litt.*). However, with government funds for conservation diminishing, and the costs of conservation increasing it remains to be seen how much longer some conservation agencies can continue to successfully maintain their high standards of field management and protection. Declining budgets not only threaten law enforcement efforts, but also the monitoring and biological management needed for sound metapopulation management and rapid rhino population growth. The critical importance of managing rhino populations for maximum productivity is shown clearly by figures 9.1 and 9.2 page 64.

In practice, declining government grants have tended to particularly threaten capital and operational budgets, and in some cases have led to staff retrenchments. Apart from affecting field conservation efforts, inadequate operational and capital budgets are demoralising for staff working in the field.

Under such circumstances, by helping to support operational programmes and capital purchases, donor agencies can play a critical role in helping to keep many of the successful rhino conservation areas a success. However, given the limited amount of donor funding available for rhinos, it is vital that support is focused on projects that can be most effective.

Options open to conservation agencies to deal with the problems of declining government grants include finding ways to cut costs without compromising quality (e.g. outsourcing some operations), to increase revenue generation to compensate for the declining budgets, or to outsource, privatise or cut non profit-making tourism

operations. By reducing the potential revenue that can be generated to subsidise the high cost of successful conservation, trade bans are seen as potentially detrimental to rhino conservation efforts by some southern African range states.

The lack of mechanisms in some government agencies for the retention of revenue generated from commercial operations (tourism, game sales etc.) within parks is another problem hampering successful rhino conservation. Many government departments therefore favour the parastatal model where they can retain most, if not all, of any revenue generated rather than the money being channelled to a central treasury.

Finally, in South Africa, transformation of the civil service coupled with declining budgets has led to many skilled and senior conservationists taking retrenchment packages, causing a skills shortage and reduced effectiveness of some provincial nature conservation departments.

## Continued commercial success of southern white rhino conservation

Live rhino sales provide significant income in South Africa to help cover the high costs of rhino conservation in both the State and private sector. For example in 1998, live rhino sales in KwaZulu-Natal generated a turnover of approximately US\$1.57 million. Taking the example of Hluhluwe-Umfolozi Park (which holds both *key 1* white and *key 1* black rhino populations), annual turnover from all game sales from the Park represented 22% of the total cost of running the Park in 1998/99 with rhino sales contributing a high proportion of this revenue (based on data supplied by A.J. Conway, C. Bourne pers. comm.).

Since white rhinos were allowed to fetch their true economic value on auction, in South Africa, prices have generally risen steadily, increasing the incentive for the private sector and local communities to conserve rhino. Over this period, despite limited sport hunting, numbers of white rhinos on private land and the amount of land available to white rhinos, has continued to increase (Buys 1987, Emslie 1994a, Buijs and Papenfus 1996, Buijs 1998, Buijs, in press.). Maintaining incentives for the private sector and communities to establish and conserve white rhino populations is an important consideration for the major range state, South Africa. Most State-run areas have a limited capacity to hold more rhinos, and future population growth will therefore increasingly have to occur on private sector land. In effect, South Africa's total carrying capacity for white rhino will be limited primarily by demand for rhino from the private sector and local communities. Numbers of rhino could double in a decade to over 15,000 but only if there is sufficient new land for surplus animals.

The number of highest-paying rhino hunters is limited to 35–45 per year (Adcock and Emslie 1994) and not all areas are suited to ecotourism. While prices have been increasing in recent years and record white rhino prices were obtained at the 1999 Hluhluwe Auction, there is no guarantee that live sale prices will continue to rise indefinitely. If the live sale price and market ever decline significantly as a result of ever-increasing white rhino numbers there could be severe consequences for rhino conservation in both the State and private sector (Emslie in press). Budgets for State conservation agencies would decline, and incentives for the private sector to conserve white rhino (and white rhino carrying capacity) would also decline.

While some surplus animals could be sold and exported to other range states, such operations are very expensive, even if the animals are donated. Sadly, if poaching continues to be controlled, the time may come when surplus white rhino may have to be culled. With white rhino numbers having the potential to double in number in a decade, there are concerns this will be sooner rather than later unless incentives for the private sector to conserve rhino can be maintained or increased.

If a controlled trade in rhino horn were ever approved by CITES this would undoubtedly increase live sale prices and incentives leading to an increase in the white rhino carrying capacity of South Africa and contributing to increased long term self-sufficiency in the country's State and private sector conservation. This is one reason the draft South African white rhino conservation and sustainable use strategy seeks to pursue the opening of a legal controlled trade in rhino products (Anon 1999). However, as discussed in the section on trade bans on page 37, any decision by CITES on whether to sanction a legal controlled trade in South African white rhino horn will need to consider what is in the best interest of all rhino taxa in all range states.

### **Inadequate legislation and weak judiciary systems**

Throughout the 1970s and 1980s, legislation in most countries was inadequate to deal with rhino poaching, thereby maintaining or increasing the poaching threat to the rhino. Those poachers and middlemen who were caught and charged often received insubstantial fines representing only a small proportion of the value of the horn in their possession. During the 1970s this was the outcome in numerous cases in Kenya, Uganda, Tanzania, and Zambia (Martin and Martin 1982).

In Swaziland, a magistrate acquitted the accused caught in possession of a rhino horn on the grounds that the horn belonged to a 'brown rhino' and that the law only prohibited possession of white and black rhino horn (Anon 1994a). To

prevent a recurrence of such an acquittal, Swazi law was amended to apply to all rhinos rather than named species. Swaziland has recently enacted laws which impose stiff penalties for rhino crimes, and no rhinos have since been poached there (although other factors may be responsible for this). Those arrested in Swaziland for rhino crimes are now not eligible for bail, and those convicted face a mandatory minimum jail sentence of five years and must also pay a fine equal to the value of the poached rhinos (a legislated amount based on South African auction prices). Should the convicted poacher be unable to pay this fine, an additional two years is added to his sentence (T. Reilly pers. comm.). Zambia has similarly removed the option of a fine and made a jail sentence mandatory for those convicted of rhino-related offences. In South Africa and Namibia rhino poachers have recently received maximum sentences of 10 year and 20 year jail terms respectively.

Despite these encouraging trends, the imposition of heavy sentences on those convicted of rhino crimes still appears to be the exception rather than the rule in some range states. Given the threat to the lives of rangers in the field, it is perhaps understandable why some countries (Zimbabwe and Kenya) have adopted a 'shoot-to-kill if necessary' policy when dealing with well-armed poaching gangs. However, it is sobering to reflect that even 'shoot-to-kill if necessary' policies have not deterred desperate people from risking their lives to poach rhinos; the perceived rewards for success are still too great.

Sadly, corruption and high level patronage have resulted in some poachers and dealers escaping the full force of the law despite impressive national legislation prohibiting poaching and horn dealing. The international community should monitor the sentences handed down in range states, rather than focus on legislative penalties.

### **Habitat changes**

Savannahs are highly dynamic ecosystems and in some cases vegetation changes can have disastrous impacts on an area's rhino carrying capacity. For example, between 1961 and 1985, black rhino numbers crashed from 279 to 87 in the Hluhluwe section of Hluhluwe-Umfolozi Park because of habitat changes. Here there was a change from more open areas dominated by strongly preferred small palatable *Acacias* to mature *Acacia* woodland, and evergreen lowland forest. This was largely caused by the low numbers of fires in the 1950s and early 1960s and exacerbated by lack of elephant and taller grass following some culling of grazing animals (Emslie 1999a). Habitat changes to earlier stages of *Acacia* bush encroachment in other areas of the same Park (Umfolozi section) have benefited the rhino. Increases in rhino numbers in these areas cancelled out declines in Hluhluwe (Emslie 1999a). Recently, following the reintroduction of elephant,

continued bush-clearing, an increase in the number of grazing animals and more frequent fires, numbers of black rhino appear to have stabilised and may even be starting to increase in Hluhluwe.

In certain cases, bush-clearing may benefit black rhino, although this is expensive, the effects may only be temporary, and future re-clearing may be required (Emslie 1999a). An adaptive management experiment in Weenen Nature Reserve also confirmed the positive benefits for

black rhino of using fire (Marchant and Pullen 1995). However, while fire can benefit black rhino in the short and longer term (Emslie 1999a, Marchant and Pullen 1995) very high fire frequencies in combination with elephant may be negative for black rhino if they reduce woody plant densities, and result in the expansion of grassland areas, as appears to be happening in the Masai-Mara (Dublin *et al.* 1990, Dublin 1991, Dublin 1995, Dublin and Wilson 1998, Morgan-Davies 1996).

# The International and Regional Framework for the Conservation of African Rhinoceroses

## The international framework

A number of initiatives and organisations affect rhino conservation at the international and continental levels. These include IUCN SSC Rhino Specialist Groups in Africa (AfRSG) and Asia (AsRSG), trade studies by TRAFFIC and other researchers, controls on international trade and resolutions under CITES, pressure by governments and NGOs on consuming countries to implement and enforce internal trade bans, international police work under Interpol, and coordinated efforts by some donor agencies to channel funding into continental and national priority projects that have a reasonable chance of success.

## The African Rhino Specialist Group (AfRSG) of IUCN/SSC

As part of the Species Survival Commission of IUCN, the African Rhino Specialist Group works to promote the recovery of African rhino populations to viable levels, and help in their long term conservation. The AfRSG is charged with providing and improving technical information and advice to government range state conservation agencies, private rhino owners and custodians, governments, NGOs, and donor agencies. The AfRSG also seeks to promote rhino conservation activities to be carried out by these agencies. In particular, the AfRSG plays a key role in the promotion and coordination of rhino conservation strategies. It also seeks to increase the conservation capacity of clients and members through the exchange of ideas, information and expertise.

### Priority-rating of projects

Against the rising costs of successfully protecting populations, and declining government funding for conservation (in real terms in most range states), it is becoming increasingly important that limited donor funds are used effectively.

The AfRSG has therefore developed criteria to rate proposed projects to determine whether they qualify as *continental priority* or *continentally important* (for criteria refer to Appendix III). In support of the desire of some donors to fund projects in particular range states, and the commendable wish of some range states without populations in the top categories to seek funding, a lower

category of *nationally important* project has also been created.

The aims of the project rating system are to:

- provide increased focus and support for the successful *key* and *important* populations to ensure they remain successful, and
- limit support to projects that have little chance of success, follow an inappropriate conservation model, or have no commitment or support from the relevant management authorities.

Through its links with the conservation departments of range state governments (via nominated official country representatives) and its specialist members based throughout Africa, the AfRSG is ideally placed to solicit, receive, review, and help prepare proposals for projects from the field. The prioritisation and evaluation of these proposed projects is a key step in the process of linking the real and urgent requirements in the field to potential donors. A number of major donor agencies now routinely refer rhino project funding proposals to the AfRSG for rating and comment.

A limitation of this process is that it is reactive to the proposals of individuals and conservation organisations. It is therefore likely to reflect the interests of the proposers rather than represent a prioritised list of all necessary actions. However, through the country representatives on the AfRSG, range state conservation agencies are encouraged to develop appropriate priority project proposals that require funding.

National and regional rhino conservation committees and management authorities (*not* the IUCN or the AfRSG) have the authority to implement conservation actions within range states. They are therefore the appropriate bodies to determine and revise a list of actions needed. The role of the AfRSG, and this Plan, is to advise and recommend approaches and strategies to these relevant authorities that can be built into their national conservation plans. Major range states have official country representatives on the AfRSG, and many key members of national and regional rhino conservation agencies are also specialist members of the AfRSG. This helps the AfRSG advise conservation management agencies on desirable rhino conservation action and projects.

On request, the AfRSG will review and rate project proposals on the basis of their continental and national priority. In some circumstances, AfRSG specialists will

improve project specifications or may simply advise against supporting inappropriate or low priority projects.

The process of priority categorisation of project proposals is presented in Appendix III. This Action Plan deliberately does not give a detailed description of specific projects and actions that need to be undertaken, as the history of rhino conservation has shown that such action lists quickly become outdated.

### **Liaison between AfRSG and the Asian Rhinoceros Specialist Group (AsRSG)**

The AfRSG and Asian Rhino Specialist Group (AsRSG) are currently working to widen the links and channels of communication between them. The aim is to encourage the sharing of information and management experience, and to ensure that actions in one continent do not adversely affect the conservation outcomes for rhinos in the other. There are currently three members (two programme officers and a trade expert) who sit on both groups, who liaise with their respective groups. Following the February 1999 AsRSG meeting, a team of senior conservationists from Nepal is also planning to visit South Africa on a study tour.

The differences in approach between Asian and African rhino conservation relate to strategic metapopulation management issues and the culture of wildlife conservation and attitudes of local communities around protected areas. In Africa, the need for sound biological management (in particular preventing overstocking with a view of achieving population growth rates of more than 5%), is widely recognised and forms a core part of this Action Plan and most national African rhino conservation plans.

Translocation has been much less practised in Asia. Asian rhino conservationists can therefore gain from exposure to the benefits of this strategic approach through links between AfRSG and AsRSG. Asian and African rhino conservationists also both profit from exposure to the conservation philosophies of different range states, and exposure to the different cultures of communities living near rhino areas. This liaison increases understanding of why different range states and regions can pursue different conservation strategies (e.g. protectionism versus sustainable use conservation, commercialisation versus non-commercialisation), and that conservation policies which might be appropriate in one state or region may be inappropriate in another. The challenge for rhino conservationists in Africa and Asia is to find policies that can be implemented to the benefit of rhino conservation in a region or state without negatively influencing rhino conservation in other states or continents.

### **Trade Records Analysis of Fauna and Flora in Commerce (TRAFFIC)**

TRAFFIC is the trade monitoring arm of the World Wide

Fund for Nature (WWF) and IUCN, and over the years has provided much of our basic understanding of the rhino horn trade. Apart from its many studies of the rhino horn trade (discussed in chapter 6), TRAFFIC is exploring culturally sensitive ways to discourage consumption of rhino horn and other rhino parts for medicinal purposes, and to encourage the use of effective substitutes. TRAFFIC also plays a major role in the development of the CITES *indicators of success* called for under CITES Resolution Conference 9.14 (see Appendix II).

TRAFFIC has undertaken a number of studies relating to the rhino trade in eastern Asia, the Middle East, and North America. In addition, members of the two rhino specialist groups, together with staff in TRAFFIC and the IUCN SSC Wildlife Trade Programme, help the Parties to CITES by reviewing proposed rhino resolutions submitted to CITES for consideration at their meetings of the Conference of the Parties. The AfRSG has also helped the CITES Standing Committee and Secretariat develop the indicators discussed in the following section.

## **CITES**

### **History of CITES trade bans**

From 1977, all African rhino species were listed on CITES Appendix I, and all international commercial trade in rhinos and their products was prohibited.

The massive decline in black rhino numbers that occurred in the late 1970s and 1980s, despite being on Appendix I, shows that international trade bans under CITES alone have been ineffective. In chapter 6 it was argued that illegal trade in endangered species can possibly only be adequately controlled if international protection is supported by effective enforcement of domestic legislation. In the 1990s increasing domestic legislation has been implemented and law enforcement effort has been made in consumer countries. Nevertheless, law enforcement action and surveys indicate that trade in rhino horn medicines continues, whether motivated by profit and/or a devotion to ancient health care remedies, despite an almost world-wide ban on commercial international and internal trade (Mills 1997). Leader-Williams (1992) concluded that CITES and other efforts may have succeeded in slowing but not halting the rhino horn trade for medicines in the Far East. However the internal bans on trade in conjunction with international trade bans under CITES may be reducing demand (Mills 1997). The critical question remains the extent to which such legislation can be enforced, and what its impact will be on demand for horn.

At the 10th meeting of the Conference of the Parties to CITES held in Harare in 1997, South Africa failed to get the necessary two thirds majority for a resolution for a full

downlisting of its southern white rhino to Appendix II with a zero quota for trade in horn.

### **CITES Resolution Conference 9.14**

At the 9th meeting of the Conference of the Parties held at Fort Lauderdale in 1994, a Resolution was drafted by AfRSG at the request of the CITES Standing Committee, and following comments from the AsRSG was passed as CITES Resolution Conference 9.14 “*Conservation of rhinoceroses in Asia and Africa*” (see Appendix II for the full text). The primary aim of this Resolution was to create a more realistic and practical framework for dealing with rhino conservation and trade issues.

The basic premise behind the Resolution was that current conservation measures, including some of the CITES provisions, had not succeeded in halting or reversing the decline in rhino numbers (although numbers of both the black and southern white rhino are stable or increasing). The illegal trade in rhino horn had grown to become a global law enforcement problem, extending beyond the range states and the traditional consumer countries, and stocks of horn continued to accumulate in some countries. The Resolution also recognised that recent international measures had some unintended consequences, including driving the trade further underground and causing prices to rise in several consumer countries. It was suggested that the destruction of stocks of rhino horn (called for under the earlier Resolution Conference 6.10) was more likely to increase the risks to remaining rhino populations.

The Resolution therefore urged Parties to the Convention to: identify, mark, register, and secure all stockpiles of rhino horn; implement adequate legislation, including internal trade restrictions, to reduce illegal trade; be more vigilant and concentrate on early detection of potential poachers; increase law enforcement cooperation to curtail trafficking in rhino horn; and work more closely with ‘traditional medicine’ communities to develop strategies to eliminate the use of rhino parts and derivatives.

The single, main recommendation of the Resolution was focused firmly on the need for each range state to develop a recovery plan for its rhino population that would be appropriate to that country. Such a plan should not adversely affect rhino conservation in other range states, should include provision for the reinvestment of revenues derived from use of rhinos to offset the costs of their conservation, and aim towards a sustainable, self-sufficient rhino conservation programme.

With regard to funding, potential donors were urged to help range states implement their plans, and the Global Environment Facility was urged to fund the protection of rhinos within a broader set of biodiversity projects.

The progress of range and consumer states towards implementing Resolution Conference 9.14 was reviewed before the 10th Conference of the Parties to CITES held in Harare in 1997 (Mainka 1997).

### **Development of standardised indicators of success**

CITES Resolution Conference 9.14 also urged the CITES Standing Committee to develop *standardised indicators of success* to measure change in levels of illegal hunting and in the status of rhino populations in range states. This followed the Resolution’s call to evaluate the effectiveness of actions aimed at reducing the illegal trade in rhino horn and to modify policies in light of the evaluation.

TRAFFIC with the AfRSG and AsRSG have helped develop the indicators process. All three organisations were represented at an international workshop of experts that was held in December 1998, under the auspices of the CITES Secretariat, to further refine this process. This workshop confirmed that the purpose of these standardised indicators was not simply to measure changes in levels of illegal hunting and population status over time, but also to understand the causes of these changes. They would be used particularly to distinguish the impact of CITES policies from the impacts of a range of other factors that could contribute to rhino population trends (TRAFFIC 1999). Workshop participants decided on a two part indicators system. This is based on population and mortality information at the site (range state) level, and rhino horn trade/trafficking information (TRAFFIC 1999).

### **Interpol – Wildlife Sub-Group**

As part of its international policing operations, Interpol has a wildlife sub-group based in Zimbabwe which collects and synthesises information on criminal wildlife trade. Representatives of the wildlife sub-group have addressed a meeting of the Southern African Rhino and Elephant Security Group to explain how they operate and to facilitate the collection of additional information on wildlife crimes.

### **Donor agencies with coordinated funding strategies**

An encouraging development in recent years is that a number of donor agencies including WWF and the USA’s Rhino and Tiger Conservation Fund are increasingly attempting to focus their efforts towards rhino conservation projects which are continental priorities, but which also have a good chance of success.

Since its founding, WWF has had an unbroken record of involvement in rhino conservation and management in Africa. Earlier efforts were primarily directed towards supporting conservation of large areas which historically held large populations of rhino (Anon 1997b, Dublin and Wilson 1998). With hindsight, as many earlier projects failed because the resources available were too few and



spread too thinly in the field, WWF understood that it needed to revamp its strategic approach to funding (Anon 1997b; Dublin and Wilson, 1998). In drawing up its own in-house Action Plan for the Conservation of Africa's Black and White Rhinos, WWF has combined lessons learnt from its own experience and research (e.g. Leader-Williams *et al.* In prep), with additional input from the AfRSG on conservation activities necessary for success (see chapter 9). It has decided on a set of priority activities that form WWF's core African Rhino Programme. To help the prioritisation process, WWF has also set up an in-house African Rhino Working Group (ARWG) which reviews all potential projects and determines their significance. The ARWG uses the AfRSG's recommended system of priority rating populations and project proposals (outlined earlier in this chapter), and in taking a continental strategic view, WWF is now giving priority to conservation actions that are likely to be effective. It believes that support of projects that result in an increase in rhino numbers in Africa is wise use of their funds (Anon 1997).

In the United States since 1996, a Rhinoceros and Tiger Conservation Act has annually provided a limited but increasing amount of funds to a Rhinoceros and Tiger Conservation Fund (RTCF), administered by the US Fish and Wildlife Service. The fund seeks to develop partnerships with government and non-government agencies in Africa and Asia. All RTCF projects must address critical needs in rhino and tiger conservation, include local matching funds, present a well-defined budget and aim for practical, sustainable results to ensure the best use of limited resources. Projects are thoroughly reviewed by a committee which to date has often sought technical comment on proposed projects from both AfRSG and AsRSG members. From 1996–1998 grants totalling US\$192,584 were given to 15 African rhino conservation projects (Anon 1999).

## The regional framework

In addition to the international and continental initiatives outlined above, there are a number of important regional African rhino conservation initiatives namely the Southern African Rhino Management Group, the Southern African Rhino and Elephant Security Group, the Lusaka Agreement and the newly-initiated Italian funded South African Development Community rhino programme.

## The Rhino Management Group

Four countries currently make up the Rhino Management Group (RMG): South Africa, Namibia, Swaziland, and Zimbabwe. Together, these countries conserve 2,100 (81%) of Africa's remaining black rhino (100% of Africa's south-western black rhinos, 97% of Africa's known south-central black rhinos, and 7% of Africa's eastern black rhinos). The Group deals only with black rhino but it was asked to facilitate a workshop, attended by all relevant stakeholders, to develop a national white rhino conservation strategy for South Africa.

The RMG was formed in 1989 to implement the 'Conservation plan for the black rhinoceros *Diceros bicornis* in South Africa and Namibia'. This Plan had been adopted early in 1989 with the support of 19 conservation agencies and NGOs in the two countries. Participation was extended to Swaziland and Zimbabwe in 1996, thereby strengthening the RMG's regional character, but to date Zimbabwe has not actively participated.

The original joint South African/Namibian conservation plan has since been succeeded by national plans. South Africa and Namibia now operate under their own country plans, but RMG member countries continue to benefit through the development and sharing of rhino conservation philosophies, strategies, and information. The RMG also continues to guide the implementation of the 1997 South African black rhino conservation plan.

The RMG comprises representatives, of all State and provincial nature conservation (wildlife) authorities in each country, as well as private rhino owners and custodians, and rhino experts.<sup>1</sup>

Since its inception, the RMG has met regularly to discuss strategic issues and review progress towards meeting rhino conservation goals. Its 12th meeting was held in March 1999. The group has coordinated and synthesised standardised annual status reporting throughout all black rhino populations in the RMG region, enabling progress towards metapopulation management goals to be assessed annually. Analyses and syntheses of all these RMG status reports are undertaken at intervals. For security reasons, the status reports and status report summaries are confidential.

The summary RMG status reports synthesise information (Emslie 1990, Emslie 1992, Adcock 1995, Adcock 1996a,b, Adcock 1998) and allow managers of each reserve to evaluate the relative performance of their

<sup>1</sup> As of March 1999, the RMG had representatives from the Namibian Ministry of Environment and Tourism (Directorate of Resource Management), Big Game Parks of Swaziland, Zimbabwe's Department of National Parks and Wildlife Management, and, from South Africa, the KwaZulu-Natal Nature Conservation Service, South African National Parks, North West Parks and Tourism Board, Mpumalanga Parks Board, Northern Province Department of Land, Agriculture and Environment, Eastern Cape Nature Conservation, Gauteng Directorate of Nature Conservation, Western Cape Nature Conservation, Free State Department of Environmental Affairs and Tourism, Northern Cape Nature Conservation Service. In addition, the private rhino-owners in South Africa are represented by the chairman of the African Rhino Owners Association (AROA). Every three years these RMG members also elect a small number of additional specialist members. The chairman (or executive officer) of the Rhino and Elephant Security Group of southern Africa (RESG) also sits on the RMG. A number of RMG members also sit on the AfRSG.

black rhino populations (and their own monitoring and management efforts) in the wider context of regional rhino conservation. The results are increasingly being used for metapopulation management.

At the International Symposium on Rhinoceros Biology and Conservation held in San Diego in May 1991, several African delegates referred to the original RMG regional plan (Brooks 1989) as a successful model to be followed. It has since been used by a number of range states in formulating their national plans. The RMG has also held a number of workshops which have provided direction and standards for rhino monitoring, boma construction, property assessments, habitat evaluation, private ownership, game scout training, and security issues.

## **The Lusaka Agreement**

In September 1994 as part of a United Nations Environment Programme (UNEP) initiative six African countries (Kenya, South Africa, Swaziland, Tanzania, Uganda and Zambia) signed the “Lusaka Agreement on Co-operative Enforcement Operations directed at Illegal Trade in Wild Fauna and Flora,” more commonly known as the “Lusaka Agreement”. Ethiopia, Democratic Republic of the Congo and Lesotho have subsequently signed the Agreement. Two of the four major rhino range states (Namibia and Zimbabwe) have not signed.

The aim of the Agreement is to reduce and ultimately eliminate illegal trade in wild fauna and flora, and to establish a permanent task force to do this. The task force, with nominated members from each of the six parties, will have an international legal status throughout the six countries to enable it to carry out its work and in particular to investigate cross-border wildlife crimes. Subject to the consent of the parties concerned, the task force will also be allowed to conduct undercover operations. The Agreement seeks to facilitate the collection, processing and dissemination of information between the parties on illegal trade as well as information about the return to the original country of export or re-export of confiscated wild fauna and flora.

In practice whilst the Lusaka Agreement has facilitated cooperation between individual parties in dealing with cross-border wildlife crimes, delays have been experienced in establishing a permanent task force, thereby hindering the full operations of the Agreement.

## **The Southern African Rhino and Elephant Security Group (RESG)**

A security group was formed as a sub-committee of the Southern African Rhino Management Group (RMG) early in 1991, with the Group’s chairman sitting as an

RMG member. The Group held regular meetings to discuss all aspects of rhino security ensuring maximum cooperation between the conservation and law enforcement agencies, and formulating appropriate strategies and programmes. By 1996 its work had expanded to include range states outside the RMG (e.g. Botswana), and its focus was broadened to encompass elephant protection. Given the more restricted focus of the RMG on black rhino conservation in a more limited geographical area it was decided it would be appropriate for the Security Group to become fully independent of the RMG and the Southern African Rhino and Elephant Security Group (RESG) was formed. The chairman (or executive officer) of the RESG continues to sit as a RMG member.

## **The Southern African Development Community (SADC) Rhino Programme**

A consortium has been formed to implement a regional programme of rhino conservation within the Southern African Development Community (SADC) member states in the framework of the 1992 Maputo Consultative Meeting. The relevant member countries are Angola, Botswana, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. SADC members currently conserve 83.1% of Africa’s black rhino and 98.3% white rhino.

The SADC Wildlife Sector Technical Co-ordinating Unit (SADC-WTCU) will chair the consortium, and provide the links with SADC for decision-making on regional rhino conservation policies and programme implementation. The four other collaborating partners in the consortium are the World Conservation Union Regional Office for Southern Africa (IUCN-ROSA) which will provide support and assistance to the SADC-WTCU in motivating and coordinating the Programme at political and technical levels; IUCN SSC’s African Rhino Specialist Group (AfRSG) which will provide rhino conservation direction and prioritisation; WWF’s Southern African Regional Programme Office which will implement, in conjunction with relevant rhino management authorities, specific rhino projects as identified within the Programme; and an Italian NGO, CESVI Cooperazione e Sviluppo. The latter will undertake programme finance and administration management as well as act as liaison between the programme’s implementing consortium and the Italian Ministry of Foreign Affairs Director-General for Development Co-operation which is funding the Programme.

The Programme has been established to provide expertise, logistic support, training, information and funding in support of SADC regional conservation projects and policies for rhinos as flagship species. These projects and policies are to be aimed at maximising population

growth rates, enhancing overall biodiversity, ensuring economic sustainability, and stimulating local community conservation awareness and involvement in the protection and wise use of rhinos. By establishing regional coordination in the management of charismatic rhino species, it is intended that a precedent will be set within SADC and coordination can be extended to other species that should be managed at a regional rather than at a local level. The SADC Rhino Programme will be limited to three rhino subspecies whose historical range and future metapopulation management includes more than one SADC state (i.e. southern African subspecies *C.s. simum*, *D.b. minor* and *D.b. bicornis*).

The Programme will concentrate on rhino projects of a regional nature, for example, those which involve sharing of expertise between SADC member states, sharing or exchange of their rhinos, are conservation models for potential replication elsewhere in the region, and/or have regional economic or political implications. The Programme will mainly be concerned with fundamental rhino management issues and with relevant aspects of land-use economics, community interactions, and applied research. It will help SADC rhino range states with the establishment of active measures to protect rhinos from poaching but will not become involved in law enforcement or the investigation of illegal activities. The Programme will not duplicate the work of the Southern African Rhino and Elephant Security Group (RESG) or any other regional security/intelligence networks such as the Lusaka Agreement.

Public and private sector rhino conservation projects, and priorities for action within the Programme will comply with the regional rhino conservation priorities which will be periodically determined by the consortium using criteria outlined by the AfRSG. The Programme seeks to complement and not duplicate existing national and regional rhino management committees (notably the RMG) and at a continental level, the work of the AfRSG.

## Continental goals and strategies for rhino conservation

At a rhino conservation symposium held in Cincinnati in 1986, it was agreed that the four black rhino subspecies should be conserved and managed separately. This strategy has been supported by the AfRSG. This means that the

desert-adapted *D.b. bicornis* would not be moved from the very arid Kunene province in Namibia to the wetter thornveld habitat of northern KwaZulu-Natal in South Africa, (where *D.b. minor* occurs), or to an area of rich volcanic soils in Kenya, which has a double rainy season and a richer vegetation, inhabited by *D.b. michaeli*. However, translocations of *D.b. minor* from KwaZulu-Natal to the lowveld of Zimbabwe, or of *D.b. bicornis* from Namibia to drier areas in south-western South Africa, are acceptable because, in both cases, the original and the recipient areas fall within the historic range of the same species.

Those attending the Cincinnati symposium agreed that the long term continental conservation goal should be to conserve at least 2,000 animals of each of the African rhinoceros subspecies.

While most would agree this represents a desirable situation in terms of long term genetic conservation, in practice, conservation of African rhinos is primarily aimed at meeting national rather than continental goals (these are set out in national conservation plans and discussed in chapter 8). There are a number of reasons for this. Firstly, the Cincinnati meeting did not have any management/decision-making authority. Secondly, when numbers of some subspecies are down to only 10 or 25 animals, it is logical to work towards more realistic short to medium term goals. Thirdly, national and regional rhino conservation committees and agencies have the authority to implement conservation actions within range states. It is appropriate that these national committees set measurable goals for the rhino populations they are responsible for conserving, rather than for all rhinos on the continent. Rhino conservation is also best addressed by national or regional management organisations and committees. Conservation problems, philosophies, and institutional capacities vary widely across Africa and there is a need to adapt and modify initiatives according to circumstances.

While there has been and still is cooperation between range states over the translocation and management of subspecies that inhabit more than one country, there are currently no agreed continental or regional subspecies metapopulation conservation goals which have the formal backing of the relevant conservation agencies. This situation may be corrected in future at either the continental level (through the AfRSG), or regional level (through RMG and/or the SADC rhino programme).

# Country Reports: Rhino Distribution, Status, and Conservation Action

The following country reports outline the rhino conservation situation in all the African range states. They cover numbers of rhino, their distribution, species status, threats to rhino, conservation measures implemented and measures proposed.

In the tables of rhino numbers given by species and year a “?” indicates that the figure is unconfirmed, a dash “–” indicates that information is unavailable.

## Angola

Black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
300	90	?	50	50	10	–	0?

### Species/subspecies account

#### South-western black rhinoceros (*D.b. bicornis*):

##### Presumed Nationally Extinct

The subspecies was originally found in southern parts of Angola. It is possible that a small number may still exist in the country.

#### South-central black rhinoceros (*D.b. minor*):

##### Presumed Nationally Extinct

Probably once found in northern Angola, the south-central black rhino is now believed to be extinct but because of the civil war, information is lacking.

In 1975, just before the major Portuguese exodus from Angola, it was estimated that there were still between 500 and 1,000 black rhino in southern Angola (B. Huntley, pers. comm.). Between 1980 and 1984, there was a marked decline in numbers (from 300 to 90); thereafter, the population fell steadily, with no known black rhino surviving in Angola by 1995.

#### Southern white rhinoceros (*C.s. simum*):

##### Presumed Nationally Extinct

Angola originally lay within the range of the southern white rhino, but by 1895, the subspecies was extinct in the country. Reintroductions were attempted in the 1980s, but these also appear to have become extinct.

### Threats

Poaching – Angola’s rhino and elephant populations

suffered during the Angolan civil war as UNITA allegedly used ivory and rhino horn to buy weapons from what was then the South African Defence Force. This probably resulted in the almost complete annihilation of rhino in southern Angola.

### Conservation measures taken

The civil war has prevented any investigation into the current status of black or white rhino in the country. No recent reports are available to produce a country population estimate of the black rhino (*D.b. bicornis* and *D.b. minor*).

### Conservation measures proposed

When the civil war ends, surveys will be needed to determine the status and distribution of any remaining rhinos as a necessary precursor to developing a rhino conservation plan.

## Botswana

Black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
30	10	<10	<10	5	4	0?	0?		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	190	125	56	27	18	20	23

### Species/subspecies account

#### South-western black rhinoceros (*D.b. bicornis*):

##### Presumed Nationally Extinct

The original range included western Botswana.

#### South-central black rhinoceros (*D.b. minor*):

##### Presumed Nationally Extinct

Original range included eastern Botswana.

There are no reliable records of the numbers of black rhino in Botswana before 1980, but it is known that many rhino were poached from the Chobe/Morembi area. In 1980, the black rhino population was estimated at 30; by 1984, it had declined to only 10, and 10 years later, there were merely unconfirmed reports of four black rhino surviving in one location. The Botswana Department of Wildlife has received no reports of confirmed sightings of black rhino

since 1994, although it has received occasional and sporadic unconfirmed reports of spoor. Without any confirmation, however, it is feared that the black rhino may now be extinct in Botswana.

**Southern white rhinoceros (*C.s. simum*):**

**IUCN Classification: Lower Risk – Conservation Dependent.**

As elsewhere in Africa (apart from South Africa), the southern white rhino was extinct in Botswana by the turn of the 19th century. From the late 1960s to 1981, 94 white rhinos were reintroduced into the country (Player 1972, P.M. Hitchins, *in litt.*), and by 1984 their numbers had increased to 190. By 1992 however, heavy poaching had reduced numbers of southern white rhino in Botswana to only 17–27 in Moremi and Chobe National Parks. With the help of what was then the Natal Parks Board game capture team, the Department of Wildlife and National Parks (DWNP) mounted an operation to capture the remaining free-ranging Botswanan white rhino population in the Ngwezumbe area of Chobe National Park. Four animals were caught and transported to one of Botswana’s rhino sanctuaries. One of the animals died in the holding pens as a result of bullet wounds inflicted by poachers just before its capture. The DWNP also initiated a capture operation in May 1994 of the remaining white rhino in the Moremi National Park. In June 1996 two rhino were moved from Moremi. Three small sanctuary populations were created where the rhinos could be better protected. The population had dropped to a low of 18 animals in 1994, but numbers have since increased under protection, and following the introduction of animals from South Africa. By 1997 there were 23 white rhino in Botswana in 1997.

**Threats**

Poaching.

**Conservation measures taken**

A formal plan for the management of the white rhino in sanctuaries has been drafted and is currently awaiting government endorsement. The plan treats the three small populations collectively as part of the ‘national herd’. Khama Rhino Sanctuary is now home to one of the world’s most heavily protected rhino populations. The Botswana Defence Force provides 24-hour protection from watch towers along the fence-line surrounding the reserve. In recent years eight white rhinos have been translocated to Botswana from North-West Parks and Tourism Board reserves in South Africa.

**Conservation measures proposed**

Protect and breed rhinos in secure sanctuaries using additional breeding stock acquired outside the country when necessary. Establishment of an additional rhino sanctuary is underway.

**Cameroon**

Western black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
110	110	30?	50	35	27	15	10

**Species/subspecies account**

**Western black rhinoceros (*D.b. longipes*):**

**IUCN Classification: Critically Endangered.**

AfRSG rating: one *key 1* population.

About 10 individuals remain, scattered across northern Cameroon. Cameroon is now the only country with a confirmed population of the western black rhino and the small number of rhino there continues to decline. In 1980 an estimated 110 individuals were present in northern Cameroon; by May 1993 this population had declined to between 30 and 35 animals. During 1994 it was reported that at least three more rhinos had been killed, and in 1996 at least another four animals were poached. Two rhinos are known to have been poached since 1996, one of which had recently been radio-tagged. Another 10 are no longer seen or reported in their previous known range (Planton, *in litt.*). WWF-sponsored surveys of range areas in 1996–97 indicated that at least 10 rhinos remained, with a possible eight others unconfirmed (Brett, *in litt.*). The remaining rhino are scattered in what appear to be seven discrete isolated groups, each of one to four rhinos separated by an average of 60km (range 30–90km), across an area of 25,000km<sup>2</sup> (Brett, *in litt.*). Because the biggest group consists of only four known animals, ensuring its long term viability is highly problematic.

**Threats**

Demographically and genetically the western black rhino seems doomed unless the discrete populations are captured and concentrated in one area of its range. Under current conditions however, this would probably make the remaining animals more vulnerable to poaching. Aside from the cost and logistical difficulties involved in locating and catching these few scattered rhinos, the carrying capacity of the habitat in the area is low. A fenced sanctuary of some 400km<sup>2</sup> would be needed to hold 20 black rhinos (Brett *in litt.*). The plight of the animals has not been helped by a drastic currency devaluation in Cameroon in 1994 which has had negative knock-on effects on conservation budgets and staff morale. Given the low density of rhinos, their scattered distribution, and lack of local conservation capacity and government commitment, consolidating the remaining rhinos will be necessary but difficult. It is essential that the necessary security measures also be put in place. The future of the western black rhino is therefore bleak.

### Conservation measures taken

An action plan for Cameroon was developed in 1993, following an international mission and workshop held at Garoua, but has not been implemented. In recent years there has been only limited progress with field surveys. A major Global Environment Facility biodiversity project, in which rhino protection was to have been given priority, has not yet started.

### Conservation measures proposed

Diplomatic efforts through IUCN are currently under way to try to persuade the Cameroon government to increase its commitment to rhino conservation, as well as to develop the most appropriate recovery plan for the subspecies. Ideally, a recovery plan should come under the responsibility of the President. The AfRSG has indicated that leaving the animals in small isolated pockets is not a conservation option. Before it is too late, the AfRSG recommends that remaining outliers be caught and consolidated into one well protected intensive protection zone or sanctuary which could be in Cameroon, or if this option is too expensive, possibly another range state. Preliminary work is underway with a view to holding a stakeholders workshop to develop concrete plans and projects to catch, consolidate and protect the few remaining rhino as soon as possible.

## Central African Republic

Black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
3,000	170	10	5	0	–	–	–

### Species/subspecies account

#### Black rhinoceros species:

##### Presumed Nationally Extinct

In 1980, the Central African Republic was a major range state for the black rhino (although the accuracy of the estimates at this time is questionable). In just four years (1980–84), the black rhino population declined dramatically from approximately 3,000 animals to about 170 (AfRSG data). By 1992, the species were considered nationally extinct.

#### Northern white rhinoceros (*C.s. cottoni*):

##### Presumed Nationally Extinct

The original range covered the eastern part of Central African Republic. Only a few animals were recorded between 1960 and 1983; by 1984 the northern white rhino was believed to be extinct in the Central African Republic.

## Chad

Western black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
25	5	3	0?	0	–	–	–

### Species/subspecies account

#### Western black rhinoceros (*D.b. longipes*):

##### Presumed Nationally Extinct

In 1980, an estimated 25 western black rhino were still alive; by 1990 there were none. Unconfirmed reports of a small number of western black rhino are received periodically, but the subspecies is presumed to be nationally extinct.

#### Northern white rhinoceros (*C.s. cottoni*): Extinct

This subspecies used to range over parts of southern Chad; by the 1960s, there was evidence of only a few animals and by 1983 no evidence.

## Democratic Republic of the Congo DRC (formerly Zaire)

Northern white rhino								
1960	1971	1976	1981	1983	1984	1991	1995	1998
1,150	250	490	<50	13–20	15	30	31	25

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

##### Presumed Nationally Extinct

The original range of the subspecies covered the southern part of the country.

#### Northern white rhinoceros (*C.s. cottoni*):

##### IUCN Classification: Critically Endangered.

AfRSG rating: one *key 1* population.

The former range included the north-eastern parts of the country, where today the only certain surviving population is found. Garamba National Park was created largely to protect the northern white rhino from poachers and has been its major stronghold ever since. Under protection, numbers of northern white rhino in the park increased from perhaps 200 in 1938 (K. Hillman-Smith, *in litt.*) to between 1,000 and 1,300 animals by 1960 (Hillman-Smith 1994).

In 1960, the Congo achieved independence from Belgium but with independence came civil war (1960–63). During this time the number of northern white rhinos declined catastrophically; according to Curry-Lindahl (1972), Garamba's rhino population fell by 90% to approximately only 100 in 1965 (although subsequent

studies based on observed rates of increase suggest that numbers fell to about 200 (K. Hillman-Smith, *in litt.*). On the basis of rhino sightings and reports of the numbers of horns found at Faradje and exported from Mombasa, Curry-Lindahl estimated that between 900 and 1,000 northern white rhinos were killed between 1963 and 1966. In 1969, rhino numbers started to recover following the formation of the Institut Zaïrois pour le Conservation de la Nature (IZCN) and restoration of control of the park (Hillman *et al.* 1993, Hillman-Smith 1994).

By 1976 the rhino population in Garamba National Park had recovered to an estimated 490 ( $\pm 270$ ) animals (Savidge *et al.* 1976). In the late 1970s and early 1980s however, a renewed increase in poaching almost led to the extinction of the northern white rhino in Zaïre. With the withdrawal of the United Nations Development Programme/Food and Agriculture Organisation (UNDP/FAO) project based in Garamba and a change in park conservator, commercial poaching began in earnest. In just eight years, from 1976 to 1984, the Garamba population was reduced from approximately 490 animals to only 15 (Smith *et al.* 1995). At least 50% of the poaching was believed to have been carried out by local park staff (Smith *et al.* 1995). In 1983 a proposal to remove all remaining northern white rhino from Garamba National Park to captive breeding sites was rejected by the government of Zaïre, who wished to conserve the remaining rhino in situ (Leader-Williams 1993). After a period of population growth and then stability, numbers doubled, reaching 31 by 1995. Then, in 1997 a civil war broke out resulting in the President Mobutu being deposed and the new state of the Democratic Republic of the Congo was declared in May 1997. Logistical problems and the destruction of equipment and supplies during this civil war made conservation management in Garamba particularly difficult. While some supplies and equipment were replaced, the southward spread of poachers into the core area occupied by the white rhino was of grave concern. The poaching situation in Garamba became very serious with armed contacts and poacher's camps increasing in number, leading to a permanent poacher presence in the Park, and the virtual elimination of animals from the northern half of the Park.

Fortunately two aerial counts in 1998 produced a minimum population estimate of 25 animals, indicating that the rhinos had survived the war with limited losses. However, it appears that elephant and buffalo populations in the Park had been heavily poached (K. Hillman-Smith, K. Adcock and C. Mackie, pers. comm.).

While the outbreak of a civil war late in 1998 caused further problems, guards were fortunately able to continue patrolling, and poaching appears to have been much less of a problem.

By 1998 the Garamba population had suffered four major periods of decline since the start of the 20th century: the 1930s, the early 1960s, the late 1970s/early 1980s, and the mid to late 1990s. Despite the encouraging progress

since 1984, the future of the northern white rhino in Garamba is by no means guaranteed.

### Threats

Poaching, political instability, war, civil unrest, limited number of breeding females and small population size.

### Conservation measures taken

*Garamba National Park Project*: an international project begun in 1984, funded initially by WWF, Frankfurt Zoological Society (FZS), and the United Nations Educational Scientific and Cultural Organisation (UNESCO), and coordinated by the IUCN. Rhino conservation is its central focus (Hillman-Smith 1994). It has proved successful despite the losses previously mentioned, with the population doubling from 15 to 30 by 1991 (an annual growth rate of 10.4%). Between 1983 and 1995 there were 24 births. (Smith *et al.* 1995).

*Rhino Conservation Action Plan for Garamba National Park*: developed in 1993.

*AfRSG international workshop*: organised in 1995 to discuss the development of a metapopulation management strategy for captive and wild northern white rhinos (Smith *et al.* 1995a, 1995b). A number of rhino conservationists favoured removing selected rhinos from Garamba and setting up a second secure but 'free-ranging' population elsewhere as a contingency measure against continued poaching. Such a move risked reducing the survival chances of the source population and no action was taken to establish a second population elsewhere.

*Garamba National Park Revised Management Plan*: an AfRSG/WWF technical assistance mission visited Garamba National Park and prepared a detailed report in early 1996 (Conway *et al.* 1996) to help the IZCN and WWF project staff draw up a revised management plan and a WWF-sponsored project for the Park. Key actions were developed including the concentration of anti-poaching effort within an intensive protection zone (rather than trying to conserve the whole Garamba ecosystem) and improved remuneration, equipment, and training for field rangers. There was an increased focus on law enforcement monitoring, and rhino data analysis and reporting. The need for improved field ranger training was identified as a key priority by both the AfRSG/WWF mission and security experts (Greef 1997, Buser 1998).

*Garamba Management Unit*: meets to assess and give advice on conservation policy as part of park management. Senior Garamba management staff, together with the Garamba Project's two serving technical advisors, are

members of this committee. In recent years the International Rhino Foundation (IRF) has played an important role in supporting field rangers and paying their primes (performance bonuses).

Democratic Republic of the Congo is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

### Conservation measures proposed

The outbreak of a new civil war in 1998 caused the postponement of a strategic planning workshop to review future plans for Garamba. However, President Kabila has pledged to support conservation and particularly Garamba. At a meeting in July 1999 between the DRC's Minister of the Environment and senior representatives of IUCN and WWF, the Minister indicated that the DRC may be willing to sanction a feasibility study to examine options for the future conservation of the Garamba population, including the desirability/risk of removing some animals. It is likely that the IRF and UNESCO will increase support for field rangers.

## Ethiopia

Eastern black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
20	10	-	0?	0?	5	1	0?

### Species/subspecies account

#### Eastern black rhinoceros (*D.b. michaeli*): Presumed Nationally Extinct

In 1980, it was estimated that there were 20 eastern black rhino in Ethiopia. By 1984, this number had been reduced to 10, and an aerial survey in 1997 found no signs of rhino (I. Craig, pers. comm.). In 1995 and 1997 a single black rhino was reportedly sighted from the air in the Mayo/Tama area (R. Lamprey pers. comm., T. Teferi *in litt.*). It seems unlikely that any significant rhino populations remain in Ethiopia but the Omo/Mayo/Tama area in the south west of the country is the most likely region in which to find any outliers (T. Teferi *in litt.*).

#### Threats

Poaching.

#### Conservation measures taken

Ethiopia has no rhino conservation plan.

The country is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

### Conservation measures proposed

Surveys of potential rhino ranges are needed to confirm the continued existence, numbers, and distribution of the subspecies. The results, if positive, can then form the basis of a national rhino conservation plan.

## Ivory Coast

Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	0	0	5	5	5	4	4

### Species/subspecies account

#### Southern white rhinoceros (*C.s. simum*):

#### Introduced to Ivory Coast. IUCN Classification: Lower Risk – Conservation Dependent

A small population of five, free-ranging southern white rhino was established in a park outside the subspecies' historical range in 1991. By 1995, the population had been reduced to four, but has since remained stable.

#### Threats

Poaching, lack of funds, weak government commitment to rhino conservation.

#### Conservation measures taken

There is no conservation plan.

#### Conservation measures proposed

None known.

## Kenya

Eastern black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
1,500	550	381	398	414	417	420	424		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	33	47	57	74	87	122	137

### Species/subspecies account

#### Eastern black rhinoceros (*D.b. michaeli*):

#### IUCN Classification: Critically Endangered.

AfRSG rating: two *key 2* populations, six *important* populations

Kenya is the stronghold of Africa's eastern black rhino holding 87% of the subspecies in 1997. There were an estimated 65,000 eastern black rhino in the 1960s, and still 18,000 in Kenya in 1970 (E. B. Martin, pers. comm.). But



the illegal hunting continued relentlessly through the 1970s, so that by 1980 there were only 1,500 eastern black rhino, and by 1987 only 380. Most of these losses were due to poaching by Somali bandits, but the problem was exacerbated by internal government corruption at the time. Tsavo National Park was particularly heavily poached (from approximately 9,000 rhinos to just 14).

The total black rhino population in Kenya has increased by just over 11% since 1987, and in 1997 stood at about 424 rhino. Much of the increase in some of the fenced sanctuaries has been cancelled out by the removal of the last remaining 'outlier' rhinos (those that the Kenya Wildlife Service has not been able to locate, confirm or translocate cost-effectively) from its national rhino totals. The performance of Kenya's metapopulation has fallen well below that of South Africa and Namibia which showed total increases of 84% and 57% respectively (based on similar initial numbers) over the same decade. With further translocations, and improved estimations of carrying capacity, it is hoped overall Kenyan metapopulation growth rates will increase in future. The difference in metapopulation performance may be due to relatively high stocking rates of rhinos and other browsers in Kenya.

#### **Southern white rhinoceros (*C.s. simum*):**

**Introduced to Kenya. IUCN Classification: Lower Risk – Conservation Dependent.**

AfRSG rating: one *key 2* population, two *important* populations.

A small number of free-ranging populations have been established outside the species' historical range. In 1984, 33 white rhino were introduced and by 1997, the population had reached 137 with 77% of these being in private ownership. Only non-consumptive use of white rhinos (through tourism) is currently allowed. In the 1990s the KwaZulu-Natal Nature Conservation Service gave 10 rhinos to the Masai Mara community and 10 to Lake Nakuru National Park.

#### **Threats**

Poaching, declining budgets, heavy browsing by other animals in some parks, fluctuating tourist demand, abundance of surplus males, limited number of safe introduction sites.

#### **Conservation measures taken**

An active programme to increase black rhino numbers was pursued from 1984, with efforts centring on the development of specially-protected, fenced sanctuaries on private land. The rhino were successfully managed on a custodianship basis on private land (e.g. Solio Ranch) and have since provided founder animals for new populations. In 1993 approximately 70% of Kenya's rhinos were under this custodianship system and the black rhino population had increased. Black rhino numbers in Kenya appear to be slowly increasing.

*The Conservation Strategy and Management Plan for the Black Rhinoceros in Kenya* (1993). This plan superseded the 1985 management/fund-raising plan for black rhino conservation in Kenya and followed the model of the Rhino Management Group's metapopulation management approach (Brett 1993). The results of a Population Habitat Viability Analysis (PHVA) workshop (Foose *et al.* 1993) were also used in developing the revised Kenyan plan.

The **long term goal** of that plan was to develop and conserve a genetically viable population of at least 2,000 eastern black rhino in their natural habitat.

The **short term goal** was to attain a target population of 600 eastern black rhino by the year 2000.

In 1997, Kenya had reached 21% of the long term goal, and 71% of the short term goal.

The **aims** of the plan were:

- to protect the black rhino in all areas of Kenya;
- to protect and promote the natural increase of all viable black rhino populations through intensive *in situ* protection of unconfined populations and of all populations located in sanctuaries (relatively small, defined areas of less than 500km<sup>2</sup> with electric fencing, and intensive anti-poaching, surveillance and monitoring systems);
- to continue to remove surplus rhinos from the sanctuaries on the basis of maximum productivity carrying capacity, in order to reintroduce black rhinos to selected larger areas of their former range, and complete stocking of new and existing sanctuary areas;
- to release rhinos from holding pens or fenced enclosures located within larger areas of protected rhino habitat so that these surrounding areas are recolonised with rhinos and enclosures can be eventually removed (subject to adequate security and high breeding output).

The **targets** in the plan were to:

- maintain and establish breeding populations in conservation areas that have sufficiently large and diverse founder populations, to breed a total of 450 black rhinos in Kenya by 1995 (in 1995, Kenya was 6.7% short of this target);
- attain a target of 600 black rhinos by 2000 (this requires a significantly higher net metapopulation growth rate of about 9% per year);
- develop at least one wild population (of at least 100 rhinos) in both a highland habitat (e.g. Aberdare, Mount Kenya) and a lowland habitat (e.g. Tsavo) by 2025.

The **management policy** as set out in the plan involved:

- protecting all black rhinos and allowing them to breed as quickly as possible within rhino conservation areas and fenced sanctuaries;
- capturing all isolated non-breeding or unviable individuals or rhino groups (outliers) and translocating them to rhino sanctuaries for their protection and for breeding;

- removing any surplus rhinos from sanctuaries where the population is approaching, or has already exceeded its carrying capacity, and using them to stock other areas;
- supporting efforts to halt all illegal trade in rhino products.

*Kenya Wildlife Service (KWS)* received substantial development aid in the early to mid 1990s. This was used to fund improvements in infrastructure (improved equipment, new vehicles) and working conditions. Staff training, discipline, and morale improved and many corrupt staff left the KWS. A new head office was built and new staff were hired. This optimism was dashed by the financial problems that plagued Kenya in the late 1990s. KWS's projected self-sufficiency based on tourism proved to be over-optimistic. Tourism to Kenya declined sharply following a number of widely publicised attacks on tourists, increasing political unrest, infrastructural decline in the lead-up to elections, and competition from South Africa and other countries as alternative ecotourism destinations. KWS also lost its funding from the Kenyan government for its conservation activities yet was still required to help maintain regional security in areas where bandits operated. The crisis forced a restructuring of KWS with inevitable staff retrenchments. The impacts of this on field conservation remain to be seen.

KWS has three rhino programme committees that meet to provide advice or information on rhino conservation issues: the National Management Committee (NMC), and the Association of Private Land Rhino Sanctuaries (APLRS). A smaller subcommittee, the National Rhino Executive Committee, comprises senior KWS staff and rhino specialists from local NGOs. It meets or consults as necessary, to consider particular management decisions such as security, staffing, and finance, and the timing, composition, location and destination of rhino captures and translocation. All decisions concerning rhino management policy and actions are approved by the director of KWS.

A National Rhino Conservation Coordinator is responsible for liaising with donors on rhino projects and activities, and for rhino security and surveillance, research and monitoring, rhino data collection and analysis, and liaison with private custodians within KWS's rhino conservation areas.

Kenya is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora, and a Kenyan was recently appointed as Director. The country is also a member of the Agreement's proposed Task Force.

### Conservation measures proposed

WWF is planning to fund a survey of rhino numbers and distribution in the Aberdare National Park (T. Teferi, pers. comm.).

Continued translocation of surplus animals in both State and private sanctuaries for both restocking of other national parks, and for genetic conservation reasons in small sanctuary populations. The Kenyan Rhino Conservation Plan (Brett 1993) is likely to be revised early in 2000.

## Malawi

South-central black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
40	20	25	5	0?	2	2	3

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

#### IUCN Classification: Critically Endangered.

Following a gradual erosion in numbers from 40 in 1980 to 25 in 1987, the last five remaining black rhinos were poached in Mwabvi Wildlife Reserve in 1990–91.

It is possible that one or two isolated animals are present in forest areas near Mamwera, but there have been no confirmed reports of sightings or spoor (M. Knight and F. Mkanda, *in litt.*). The current population of south-central black rhinos is made up of re-introductions from South Africa. In 1993, two such rhinos were translocated to a 15km<sup>2</sup> fenced sanctuary within Liwonde National Park. A calf was born in 1997 taking the number to three. Problems exist with the surrounding community objecting to the fence around the Park. The fence has been vandalised and some sections stolen with many snares being set (Knight and Mkanda, *in litt.*). The sanctuary fence has however been left intact (P. Thomson, pers. comm.).

#### Threats

Poaching, theft of security fencing, small founder number and low carrying capacity of existing sanctuary.

#### Conservation measures taken

Malawi has a formal national conservation plan. Its objectives are to ensure the recovery of the south-central black rhino to a viable level within the country through the following strategies:

- consolidation of data on range, distribution and population size of black rhinos in the country;
- establishing a sanctuary and a monitoring programme in Liwonde National Park;
- improving the Department of Wildlife and National Parks funding base and infrastructure to manage black rhinos;
- canvassing government and public support for the programme.

### Conservation measures proposed

There are plans to expand the sanctuary by a further 6 to 11 km<sup>2</sup> depending on whether a further one or two rhinos are introduced (M. Knight *in litt.*).

## Mozambique

South-central black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
250	130	?	50	50	45	?	13		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	1	-	-	-	-	-	-

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

##### IUCN Classification: Critically Endangered

The exact status of Mozambique's black rhino population has been unclear for many years as a result of the civil war which began in 1964, but there were probably less than 45 animals remaining by 1993/94. In recent years, animals or spoor have reportedly been seen in the provinces of Tete, Manica and Niassa. Based on reported sightings and spoor, the population in 1997 was estimated at 7–13. Du Toit reported no rhino in the Tete area and there have been no recent signs (R. du Toit, *in litt.*).

#### Southern white rhinoceros (*C.s. simum*):

##### Nationally Extinct/Reintroduced/Nationally Extinct.

By 1972, 83 white rhino had been reintroduced into Mozambique (71 into Maputo Game Reserve and 12 into Gorongosa National Park), but as a result of the civil war and poaching only one remained by 1984. By 1987 the species was believed to have died out in Mozambique for the second time.

### Threats

Poaching, lack of funding for wildlife department.

### Conservation measures taken

Poaching of further animals for meat by both Tanzanians and Mozambicans in northern Mozambique is a potential threat as snares set for game may inadvertently catch rhino or fatally wound them. The wildlife department is under-funded and under-staffed (D. Grossman, pers comm.) and currently does not have the capacity to survey or protect the rhino. Mozambique has no conservation plan for its few remaining black rhino.

### Conservation measures proposed

Surveys to determine the status and distribution of remaining rhinos are planned for Tete Province, and more

information should come from Niassa Game Reserve. These surveys will be a necessary precursor to the development of a rhino conservation plan.

## Namibia

South-western black rhino									
1980	1984	1987	1990	1991	1992	1993/4	1995	1997	
300	400	449	421	479	489	583	598	707	
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	70	63	80	91	98	107	141

### Species/subspecies account

#### South-western black rhinoceros (*D.b. bicornis*):

##### IUCN Classification: Critically Endangered.

AfRSG rating: two *key 1* populations, one *important* population.

The historical range of this subspecies included the desert and arid savannah areas of Namibia, and today these areas are the stronghold for the subspecies (95% of the African population of south-western black rhino in 1997). In recent years some small populations have been re-established elsewhere in Namibia.

Before 1979, black rhino numbers had been declining through poaching (linked partly to the war of independence in what was then South-West Africa). Some senior South African military and political figures were reportedly involved in the poaching (Potgeiter 1995). Public outcry, together with increasing support for local protection efforts by international and local conservation agencies, have helped stem these activities, and the low point in 1980 (300 rhinos) has not been repeated. The population has shown a steady increase, with the total estimated number of black rhino growing from 421 to 707 animals between 1990 and 1997. This increase was partly due to improved population estimation in the biggest population. A number of new populations were formed from two areas holding black rhino, including a small number on private land, where black rhino are managed on a custodianship basis on behalf of the State. Namibia has one famous key population of south-western black rhino that are commonly known as "desert" rhinos as they live in an area that has an annual rainfall of only 150–200mm.

#### Southern white rhinoceros (*C.s. simum*):

##### Nationally Extinct/Reintroduced. IUCN Classification: Lower risk – Conservation Dependent.

AfRSG rating: two *important* populations.

Namibia reintroduced southern white rhinos into the country and by 1984 the population had reached 70. In 1993, there were 99 white rhinos in one State-run Park and

six private game parks. By 1997, the number had increased steadily to a satisfactory total of 141 individuals in 10 populations. The majority are privately owned and, as in South Africa, landowners are allowed to realise their investment in white rhino through tourism, live sales, and limited sport hunting of surplus bulls (and occasionally old females).

**Threats**

Poaching, declining conservation budgets.

**Conservation measures taken**

Rhino poachers have recently received 20-year jail sentences which is hoped will prove an effective deterrent. Although being part of the regional Rhino Management Group initiative since its inception in 1989, Namibia has its own formal national plan, the Rhinoceros Conservation Plan for Namibia which covers both black and white rhino.

Implementation of the Namibian plan is undertaken as far as possible in cooperation with regional and international organisations such as the RMG, AfRSG, WWF, and CITES. The **goals** of the national plan are to:

- establish a long term viable population of at least 2,000 black rhino and 500 white rhinos in suitable habitats (in 1997 Namibia had reached 35% and 28% of the targets for black and white rhino, respectively). If the black rhino annual growth rate of 7.7% (1989–96) can be maintained, Namibia will meet its black rhino conservation goal by 2011 (Adcock 1998);
- implement a use scheme for black and white rhino to achieve and justify the above goal in accordance with CITES regulations;
- investigate and institute a National Rhino Conservation Plan, an annual action plan, and research projects to cover issues such as dehorning, vaccination, translocation, and sale of wild animals, and to cooperate as far as possible with regional and international organisations.

*Rhino Advisory Committee (RAC)*: meets regularly to discuss national issues, to exchange information, and to implement the national plan. The RAC advises top management in the Ministry of Environment and Tourism on issues relating to rhinos. Namibia’s management programme is aimed at monitoring populations, preventing poaching, and establishing new populations in suitable habitat. Its research programme is aimed at improving monitoring (through more effective radio-marking of individual rhinos), improving data collection, and increasing understanding of rhino-habitat interactions.

Namibia has achieved considerable success in conservation of the black rhino in recent years. Sound biological management and good field protection have allowed numbers to increase allowing the re-establishment of a number of new populations. The ongoing recovery of

Namibia’s desert-adapted black rhino population, which is found on communal land outside formally protected areas, has been especially encouraging. The use of community game guards in the area to help the Ministry in its conservation efforts has received much international publicity and financial support, and is a successful example of community involvement in conservation. The first dehorning of black rhinos was carried out here and subsequent intelligence information shows this has been successful. Would-be poachers lost interest following publicity that the rhinos no longer had horns.

In 1995, a founder breeding group of eight black rhino was sold to a private game farm within the historic range of *D.b. bicornis* raising Nam\$800,000 (approximately US\$133,000). Local conservationists believed that this was an important public demonstration of the value of these animals that would act as an incentive for the implementation of conservation measures (K. P. Erb, *in litt.*).

**Conservation measures proposed**

Update the national action plan regularly and continue dehorning as a poaching deterrent.

**Rwanda**

Eastern black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
30	15	15	–	15	10	4	4

**Species/subspecies account**

**Eastern black rhinoceros (*D.b. michaeli*):**

**IUCN Classification: Critically Endangered**

In 1957, seven black rhinos were reintroduced into Akagera National Park from Tanzania. By 1995 it was believed that the species may have become nationally extinct following the poaching of 15 to 20 animals (E. Martin, *in litt.*). Following reported sightings in 1996 (J-P Van der Weghe, pers. comm. to H. T. Dublin) and again in 1998 (S. Williams pers. comm.) however, four, possibly five animals still survive.

**Threats**

Poaching, influxes of refugees, the reduction in the size of Akagera National Park and the establishment of new boundaries has left rhinos outside protected areas.

**Conservation measures taken**

Although the continued presence of a very small number of black rhinos has been confirmed in Akagera National Park, Rwanda does not have a conservation plan for these animals (Stuart Williams pers. comm.).

## Conservation measures proposed

None.

## Somalia

Eastern black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
300	90	-	0?	0	-	-	-

## Species/subspecies account

### Eastern black rhinoceros (*D.b. michaeli*):

#### Presumed Nationally Extinct

This subspecies was once distributed through Somalia. The population fell markedly between 1980 and 1984 (from 300 to 90 animals), and by 1987 was presumed to be nationally extinct. Reports of eastern black rhino are received occasionally, but they all remain unconfirmed.

## South Africa

Black rhino										
1980	1984	1987	1991	1992	1993/4	1995	1997			
630	640	577	771	819	897	1,024	1,043			
Southern white rhino										
1895	1929	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
20	150	550	1,800	3,234	4,137	5,057	5,297	6,376	7,095	7,913

## Species/subspecies account

### Black rhinoceros species: IUCN Classification:

#### Critically Endangered.

AfRSG rating: two *key 1* populations, one *key 2*, and six *important*.

By 1930 there were only about 110 black rhinos (*D.b. minor*) left in South Africa (restricted to just two parks in Kwazulu-Natal). The other two subspecies have been reintroduced (*D.b. bicornis*) from Namibia or introduced (*D.b. michaeli*) from Kenya. In addition to the 110 *D.b. minor* in KwaZulu-Natal which provided the bulk of the founder animals for new populations, 12 more were introduced into Kruger National Park from Zimbabwe in 1972. Under translocation and protection, these animals, together with two additional cross-border strays into Kruger had increased to 976 by 1997. Since the 1960s, translocation to new protected areas has been an integral part of South Africa's black rhino conservation efforts, and by 1997 the country had 1,043 black rhino spread across 25 populations, a nine-fold increase in numbers over 60 years.

In 1997, this total could be broken down by subspecies as follows:

#### South-central black rhino (*D.b. minor*)

976 rhino in 19 populations

#### South-western black (*D.b. bicornis*)

34 rhino in 5 populations

#### Eastern black rhino (*D.b. michaeli*)

33 rhino in 1 population

The only major decline in numbers occurred in the Hluhluwe part of Hluhluwe-Umfolozi Park, where numbers crashed from 279 to 87 between 1961 and 1985. This was a result of habitat changes in the 1950s and 1960s when the lack of elephants and fewer fires greatly reduced the carrying capacity of the land for black rhino (Emslie 1999a). Fortunately, habitat changes in other drier areas of Hluhluwe-Umfolozi Park were favourable to black rhino, and numbers have increased greatly in those areas. Numbers across the whole park are now higher than at any time since 1930. Black rhinos have further benefited from the successful re-establishment of elephant in the park, limited bush-clearing, and more frequent fires. However, ongoing changes may reduce the Park's carrying capacity in future unless further management action is undertaken (Emslie and Adcock 1994b, Emslie 1999a). There have been declines in Ithala and Eastern Shores which seem to be due to over-stocking and animals have been translocated from Ithala to reduce the population density.

*Ownership:* since 1990, privately-owned black rhino populations have been established on private land. The overall number of black rhino in privately-owned populations is still relatively small with 62 in seven populations in 1997, representing 6% of the national total.

### South-western black rhinoceros (*D.b. bicornis*)

The original range of this subspecies included south-western South Africa. In recent years some small populations have been re-established in the south-western part of South Africa. In 1995, eight *D.b. bicornis* were bought by a South African private game reserve at an auction in Namibia.

### South-central black rhinoceros (*D.b. minor*)

This is the most numerous black rhino subspecies, and its stronghold is South Africa. In 1997, South Africa held 72% of the known remaining south-central black rhino. Small breeding groups of *D.b. minor* are auctioned annually by the KwaZulu-Natal Nature Conservation Service, only to approved buyers. In 1998 a founder group of 28 *D.b. minor* was sold to a private conservancy in Zimbabwe.

### Eastern black rhino (*D.b. michaeli*)

In Addo Elephant National Park an important free-ranging population of this subspecies built up from a small initial

founder population introduced from Kenya in the 1960s. This population is outside its historic range. Six animals have since been re-introduced back into the historic range of the subspecies in Tanzania, while an orphaned male has been brought from Tanzania to introduce new blood. To create space for the consolidation of all these rhinos to State-owned south-western black rhino in Addo, the remaining eastern black rhino have been captured and are being introduced into one other national park and one private reserve.

#### **White rhino species**

**Southern white rhinoceros (*C.s. simum*):**

**IUCN Classification: Lower Risk – Conservation Dependent.**

*A/RSG* rating: four *key* 1 populations, five *key* 2, and 25 *important*.

At the end of the 19th century, only a few animals remained in one population in the Umfolozi area of what today is Hluhluwe-Umfolozi Park in KwaZulu-Natal, South Africa. Even as recently as 1960, South Africa had the unenviable distinction of holding all of Africa's surviving southern white rhino, and still in only one population. Following continued protection, and extensive translocation of animals both inside and outside South Africa, numbers of southern white rhino have increased rapidly. Today, South Africa is the stronghold for the southern white rhino with 7,913 animals in 1997.

The recovery began a century ago following the establishment of Umfolozi Game Reserve. In the 1960s the Natal Parks Board, in association with Dr Tony Harthoorn (1962), developed and improved white rhino immobilisation, capture, and translocation techniques, and started re-establishing populations of white rhino throughout its former range. The first removals took place in 1961 with animals being taken to the nearby Umkhuze and Ndumo Game Reserves. By 1967, it was estimated that numbers within Hluhluwe-Umfolozi had increased to 1,600. By March 1972, 1,109 white rhino had been translocated by the Natal Parks Board to parks and reserves throughout Africa and to captive breeding institutions world-wide (Player 1972). Translocation of animals increased through the 1970s with 2,648 removed from Hluhluwe-Umfolozi Park alone from 1967 to 1981 (Brooks and Macdonald 1983). By 1996 the Natal Parks Board had moved about 4,350 southern white rhino (and 340 black rhino). All remaining southern white rhino in the world therefore originate from Umfolozi stock.

The success of this programme is indicated by the fact that at the ninth CITES Conference of the Parties in 1994, a proposal to downlist South Africa's southern white rhino from Appendix I to Appendix II but only for trade in live animals to 'approved and acceptable' destinations, and for the (continued) export of legal hunting trophies was passed by a significant majority (66 in favour, two

against). A proposal by South Africa to downlist its southern white rhino population to allow for a limited trade in southern white rhino horn with an initial zero quota failed to get the necessary two-thirds votes.

#### **Threats**

Poaching, habitat changes, declining conservation budgets. Although white rhino are more easily poached than black rhino, poaching of southern white rhinos in South Africa was infrequent. However, since 1993, 59 of the 61 rhino poached in South Africa were white. Poaching levels increased around the time of the independence elections, peaking at 26 rhinos in 1994, but have since declined with only six poached in 1996 and four in 1997. A key future threat is the limit of white rhino carrying capacity in South Africa. This is likely to vary according to the economic incentives for the private sector and local communities to support conservation.

#### **Conservation measures taken (black rhinos)**

Although an indirect conservation measure, rhino poachers have recently been sentenced to 10 year jail terms in South Africa and a precedent for severe sentencing has been established.

*Regional Black Rhino Conservation Plan* (1989): drawn up by the Rhino Management Group (Brooks 1989). The plan sets clear goals based on breeding programmes for black rhinos to increase population numbers as quickly as possible. Target numbers were established for each of the three subspecies inhabiting the region (one of which is out of its natural range).

*Conservation Plan for the Black Rhinoceros, Diceros bicornis, in South Africa* (1997). This revised national South African black rhino conservation plan (Brooks and Adcock 1997) supersedes the original joint plan and has since been adopted by the Rhino Management Group. It sets clear, national target numbers for each subspecies of black rhino and is structured to help field managers in decision-making. It is circulated to all relevant conservation bodies and black rhino reserves in South Africa. The **objectives** are to:

- develop as quickly as possible, and conserve in the long term, genetically viable populations of at least 2,000 *D.b. minor* and 200 *D.b. bicornis* within their former range in South Africa;
- develop as rapidly as possible, and conserve in the long term, genetically viable populations of 75 *D.b. michaeli* in the wild in South Africa;
- support captive breeding programmes, both within and outside South Africa, provided they play a significant role in maintaining or improving the conservation status of the species.

Progress to date:

- In 1997 South Africa had reached 49%, 17%, and 44% of its targets for *D.b. minor*, *D.b. bicornis*, and *D.b. michaeli* respectively.
- Over the period 1989–96 the average net growth rate of the metapopulation was 6.7% per year (Adcock 1998). Over the same period, the average net growth rates of the *D.b. michaeli* and *D.b. bicornis* metapopulations was 7.8% and 3.9% per year. At these growth rates, South Africa will meet its goal for *D.b. minor* in the year 2007, *D.b. bicornis* in 2045 and *D.b. michaeli* in 2007.

The **approaches/actions** needed to implement the black rhino plan include:

- protecting rhino from poaching through:
  - the development of ground surveillance and reaction capabilities
  - improving and maintaining good neighbour relations around reserves
  - the development of intelligence networks
  - in-depth investigation of horn poaching and dealing cases
  - the securing of horn stockpiles
  - the support of CITES resolutions (especially Resolution Conference 9.14)
  - working towards the improvement and standardisation of legislation
  - conducting trade and economic analyses to assess threats;
- striving to maintain metapopulation genetic diversity;
- managing each population of black rhino around its estimated maximum productivity carrying capacity (set at approximately 75% of estimated ecological carrying capacity);
- facilitating sound biological management within the metapopulation by striving to estimate population sizes within 10% of exact size every one to three years, and by monitoring population dynamics, breeding performance, causes of death, and behavioural characteristics;
- submission of annual standardised status reports on each population in the region to the RMG to help guide and improve metapopulation decision-making;
- translocating animals from well-established populations approaching carrying capacity to form a range of discrete populations in suitable habitat within their historical range;
- supporting captive breeding, provided this does not detract from wild conservation efforts.

### **Conservation measures taken (white rhinos)**

*Ownership:* South Africa pioneered the private ownership of white rhino in the late 1960s. However, it was only in 1989 that the Natal Parks Board started selling its rhinos

at market value. By 1997, a fifth of Africa's southern white rhino (1,785 out of a total of 8,441) were conserved on 163 private reserves in South Africa.

The move to private ownership has increased the land area available to rhinos and increased the revenue of parastatal parks boards such as the KwaZulu-Natal Nature Conservation Service (formed by the amalgamation of the Natal Parks Board and the KwaZulu-Natal Department of Nature Conservation) and North West Parks Board (formerly Bophutatswana Parks Board) in South Africa.

By the late 1960s, numbers of white rhino in State reserves had increased to the extent that homes for surplus animals were sought on private land. To attract the interest of private landowners animals were initially offered for sale at very low prices. The result was that some animals were bought by owners with only marginally suitable habitat while others went to owners interested only in making quick profits from hunting (Buys 1987). Once the animals were allowed to fetch their true market price, however, the situation improved dramatically (Adcock and Emslie 1994). By 1994, 1,250 rhinos were found in areas outside State lands, with the majority of these (1,199 rhinos) found on private land (Emslie 1994a), an increase from 791 in 1987 (Buys 1987). Surveys undertaken in 1996 and 1997 indicated that the number on private land continued to increase, reaching 1,477 by June 1996 (Buijs and Papenfus 1996) and 1,742 by December 1997 (Buijs 1998). These increases are a combination of natural population growth and the addition of purchased stock. Live sale prices have continued to increase, reaching record levels at the 1998 Hluhluwe Game Auction where 45 white rhinos sold for Rand 5.234 million (about US\$870,000), with a cow and calf fetching a record Rand 235,000 (US\$39,000). Average prices at the 1999 Hluhluwe game auction increased further setting new records. Given the declining government grants for conservation, revenue from live sales is becoming increasingly important to help fund rhino conservation efforts.

In South Africa, a small number of military bases have wildlife reserves containing a few white rhino. The contribution of these small reserves to total southern white rhino numbers is very small (15 rhino on 5,000ha). Similarly, only 22 southern white rhinos occur on 6,800ha of small zoo-owned nature reserves in South Africa.

*Sport hunting of surplus white rhino:* sport hunting of white rhinos has taken place in South Africa since 1968. This limited hunting of surplus males – 0.5% to 0.6% of white rhinos in South Africa are hunted annually (Adcock and Emslie 1994) – is seen as playing an important role in helping fund conservation, as well as in promoting wildlife conservation as an economically viable form of land use. Parastatal conservation agencies, such as the KwaZulu-Natal Nature Conservation Service and North West Environmental Conservation, benefit financially as they can keep any profits from live rhino sales and hunting fees

which would normally have gone to central government. Until recently South Africa did not have a white rhino conservation plan or strategy, although in practice, many of the principles of black rhino management have also been applied to white rhinos. In particular, effective protection, coupled with translocation and the establishment of new populations, and the commercialisation of rhino conservation has resulted in increasing rhino numbers, and increasing numbers of discrete rhino populations.

Recognising the need for a national white rhino conservation strategy, the RMG facilitated the development of a strategy for the conservation and sustainable use of wild populations of southern white rhino in South Africa. A workshop was convened at which all stakeholders were represented together with a number of rhino experts. A draft strategy (Anon 1999) produced by the workshop has been submitted to the South African Department of the Environment and Tourism (DEAT) to be circulated more widely for comment. Meanwhile, all stakeholder agencies who attended the workshop were requested to implement the draft strategy.

Considering its critical international role in the conservation of the southern white rhino, South Africa's new strategy was based on a vision for the subspecies which included: *viable populations* in natural habitat throughout its range; *shared commitment* by the State, communities and private landowners to the implementation of effective conservation management programmes; *significant flow* of social and economic benefits to people at all levels, and *continued national self-sufficiency* in conserving white rhino.

The key components of the Strategy involve biological management, security, protection and law enforcement, sustainable use, animal welfare, and community involvement and coordination.

The objective of the draft Strategy is to achieve a medium-term metapopulation growth rate of at least 5%, and to ensure long term genetic and demographic viability in at least the State and private/community sectors. From 1987–1997, the number of white rhino in South Africa increased at an average of 6.7% per year (Emslie, in press). The aim is also to develop and maintain, in State protected areas, at least two populations of more than 1,000 rhinos, three greater than 100 and 10 greater than 50; and in private/communal ownership at least three populations greater than 100 and five greater than 50.

The Strategy recognises that the major threats to rhino numbers are poaching and illegal trade, and that these must be minimised to sustain population growth and maintain the economic, tourism, social and community benefits of white rhino. It therefore seeks to reduce the effects of poaching on populations, and ensure the successful conviction and sentencing of rhino poachers and illegal traders.

It is recognised that the expansion of rhino populations (especially on private/communal land) and the continuation of the appropriate conservation programmes (in the face of declining State contributions to nature conservation) require economic incentives to be maximised. The Strategy seeks to develop the socio-economic sustainability of white rhino conservation and promote the benefits of sustainable use. It proposes a number of both consumptive and non-consumptive uses of rhino to achieve this including pursuing the opening of a legal trade in white rhino products in accordance with international agreements and conventions, including CITES.

A further objective is to ensure that nationally accepted standards of animal welfare are implemented in white rhino conservation.

As the long term conservation of white rhino depends on the support and participation of all sectors of the South African population, the draft strategy seeks to promote and facilitate the participation and involvement of local communities and other stakeholders in the conservation and sustainable use of white rhinos.

Finally, in recognition of the need for improved management and controls to maximise the conservation and sustainable use of white rhinos to the benefit of all parties, the draft strategy proposes actions to ensure the effective coordination of the white rhino industry in South Africa.

The draft strategy also lists a number of indicators of success.

### **Conservation measures taken (all rhino species)**

A recent trend in South Africa has been the creation of contractual parks where fences may be removed between State game reserves or between national parks and surrounding private game reserves to create larger wildlife areas. An example is the removal of much of the western boundary fence of Kruger National Park in South Africa so that rhinos can now move freely between private and State land. The greater Kruger system, however, remains fenced.

The South African Police Service has a specialist Endangered Species Protection Unit which has been very successful in investigating crimes against rhinos. This unit coordinates much of the security and intelligence work in the region, and is linked directly with the professional undercover wildlife investigators who work for the formal nature conservation bodies. Following increased efforts to investigate rhino crimes and prosecute offenders, a precedent has recently been set for the severe sentencing of those convicted of rhino crimes. Using expert witnesses in court has helped secure these convictions. The African Rhino Owners Association is increasingly acting to support and coordinate conservation efforts on private land.



South Africa is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

### Conservation measures proposed

Proposed conservation measures are detailed in both the RMG South African black rhino conservation plan and the new draft strategy for the conservation and sustainable use of South African white rhino. The most controversial of these proposed measures is the seeking of an opening of a controlled legal trade in white rhino products in accordance with CITES.

## Sudan

Eastern black rhino								
1980	1984	1987	1991	1992	1993/4	1995	1997	
300	100	3	-	5?	0	-	-	
Northern white rhino								
1960	1971	1976	1981	1983	1984	1991	1995	1998
1,000	400	-	<300	<50	0?	0?	0?	0?

### Species/subspecies account

#### Eastern black rhinoceros (*D.b. michaeli*):

##### Presumed Nationally Extinct

From a total of 300 black rhinos in 1980, Sudan saw its population decimated by 1993. Occasional reports of eastern black rhino are occasionally received but they all remain unconfirmed.

#### Northern white rhinoceros (*C.s. cottoni*):

##### Presumed Nationally Extinct

This subspecies used to range over parts of south-western Sudan, and in the 1960s, an estimated 1,000 animals were still roaming the country. By 1984, however, the subspecies had probably become extinct in Sudan. There have been unconfirmed reports of a few isolated outlying rhino populations surviving in southern areas (Smith *et al.* 1995, P. Winter, pers. comm.), and indications of spoor (K. Hillman-Smith, pers comm.).

### Threats

Poaching, civil war.

### Conservation measures taken

The Southern National Park in Sudan was created in 1939 largely to protect the northern white rhino (K. Hillman-Smith, *in litt.*).

### Conservation measures proposed

Surveys are urgently needed in Sudan to determine the status and distribution of any remaining rhinos. A survey

to search for signs of northern white rhinos is scheduled to begin shortly in southern Sudan (E. Martin pers. comm.).

## Swaziland

South-central black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
0	0	6	6	6	4	9	10		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	60	80	60	46	33	41	50

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

##### Nationally Extinct/Reintroduced to Swaziland. IUCN Classification: Critically Endangered.

Swaziland lost its last indigenous black rhino before the end of the 19th century. Six black rhinos were reintroduced into one fenced and well-protected privately-run reserve in 1987 (E. Reilly, pers. comm.). Numbers have recently increased with the donation to his Royal Highness King Mswati III of Swaziland of an additional six black rhinos, funded by the President of Taiwan. These black rhinos are being managed on a custodianship basis by Big Game Parks of Swaziland. The level of protection in the Parks is very high, and penalties for anyone convicted of rhino crimes in Swaziland are severe. No rhinos (black or white) have been poached in Swaziland since late 1992. Private sector custodians have played a key role in national black rhino conservation efforts.

#### Southern white rhinoceros (*C.s. simum*):

##### Reintroduced to Swaziland. IUCN Classification: Lower Risk – Conservation Dependent.

AfRSG rating: one *important* population.

Southern white rhinos were reintroduced into Swaziland in the early 1980s, and by 1987 had bred up to 80. 50 rhino were then killed during a period of rampant poaching from 1990-92. At this time the courts failed to enforce the law or pass adequate sentences. A record drought led to more deaths in 1993. Between 1987 and 1994 numbers therefore more than halved. The last four rhino in Mlawula were translocated out, and by 1994 the Swaziland National Trust Commission no longer had any rhinos in its areas. In December 1992 the security situation was turned around, and no rhinos have been poached since then; in large measure due to the good protection given them by Big Game Parks of Swaziland. Under protection, numbers have been steadily increasing since 1993/94.

### Threats

Poaching, proposed sugar cane planting in part of one rhino park.

### Conservation measures taken

With the decimation of Swaziland's rhino populations in the early 1990s, no rhinos survived in Swaziland National Trust Commission Parks and no national conservation plan has been formulated. However, Swaziland's Big Game Parks joined the regional Rhino Management Group in 1996.

All surviving rhinos now occur in areas managed privately by Big Game Parks of Swaziland, which has conservation goals for both black and white rhino (Reilly, *in litt.*). These goals are:

- to breed both black and white rhino to distributable numbers as quickly as possible; and
- to expand the numbers of *D.b. minor* for distribution to other conservation areas, thus increasing its chances of long term survival.

All rhinos are currently well protected in sanctuaries and law enforcement effort has meant that no rhinos have been poached in Swaziland since December 1992. A number of factors have contributed to this success:

- effective intelligence (including cross-border cooperation);
- the rearming of scouts with semi-automatic rifles;
- an incident at Big Bend where two poachers were killed;
- dehorning one park's white rhino and concentrating the animals in an electrified sanctuary;
- new penalties which translate into mandatory minimum jail terms of five to seven years. If convicted, poachers and dealers face a minimum mandatory jail sentence of five years with an additional two years if they cannot refund the full market value of the animals poached, including the value of the horn;
- the passing of the Non-Bailable Offences Act. Anyone arrested on suspicion of involvement in a rhino crime is refused bail;
- altering judicial protocol to curb the discretionary power of magistrates in offences tried under section 8 of the Game Act;
- amendment of the Game Act to register all rhinos and legislate for mandatory confiscation by the State of all vehicles, guns, and other equipment possessed or used during the committing of an offence under the Act;
- granting rangers the right to search and arrest suspects without warrant and in performing their duties, to shoot to kill in life threatening circumstances with immunity from prosecution. This right is subject to the approval of the Attorney-General who may withdraw it if there is evidence of an abuse of privilege by rangers;
- an increase in the morale of the rangers following the changes to legislation.

### Conservation measures proposed

When numbers of both black and white rhinos build up, the aim is to translocate them to other adequately protected suitable habitats in Swaziland.

## Tanzania

Western black rhino							
1980	1984	1987	1991	1992	1993/4	1995	1997
3,795	3,130	275	185?	127	132	32	46

### Species/subspecies account

#### **Black rhinoceros species: IUCN Classification: Critically Endangered.**

AfRSG rating: one *important* population.

In 1980, Tanzania was one of three major range states for black rhino but poaching has since eliminated most of its animals. Until recently the lack of adequate population estimates for the country has been a problem but from an estimated 3,795 black rhino in 1980, the number in Tanzania had plummeted to only 46 by 1997. The latter figure is believed to be a conservative estimate, and surveys may refine the estimated number of south-central black rhino.

#### **Eastern black rhinoceros (*D.b. michaeli*)**

The rhinos are found in the north central region of the country. While numbers of eastern black rhino in the Ngorongoro Crater are closely monitored, the lack of adequate population estimates for other populations in Tanzania has been a problem for several years. Survey work in other areas has primarily concentrated on rough reconnaissance surveys to identify the few remaining black rhinos surviving in isolated pockets. As a result of continued poaching, numbers of eastern black rhino in the Ngorongoro Conservation Area declined from 20 in 1992 to 13 in 1997 (K. Hillman-Smith *in litt.*), and an additional young orphaned male was removed to a camp near Arusha to protect it from predator attacks. This animal has since been translocated to Addo Elephant National Park to introduce new blood. In return, a cow and calf have been successfully translocated from Addo to Ngorongoro. Four *D.b. michaeli* from South Africa have recently been established in a privately-managed sanctuary within a privately-run State-owned and gazetted game reserve.

#### **South-central black rhinoceros (*D.b. minor*)**

This subspecies occurred in the west and south of the country, but is now restricted to isolated pockets in an area of southern Tanzania. Survey work has been restricted to identification of the remaining rhino in isolated pockets in one reserve (O'Ryan and Morgan-Davies 1998). More rhinos may still survive in other, as yet, unknown pockets.

### Threats

Poaching and lack of resources in some areas.

### Conservation measures taken

In June 1989, in 'Operation Uhai', Tanzanian government forces launched a major crackdown on ivory and rhino horn poachers, dealers and traders. This campaign significantly reduced poaching at the time. Anti-poaching efforts have been increased in the Selous National Park (E. Severre and L. Siege, pers. comm.), and surveys indicate that elephant numbers in the Park (and across southern Tanzania) have increased substantially (Stronach and Laurie, pers. comm.). In a joint Frankfurt Zoological Society and Ngorongoro Conservation Area Authority project, security has recently been tightened in the Ngorongoro Crater, home to the greatest number of *D.b. michaeli* remaining in Tanzania. There is still concern for the security of some of the rhino remaining in the northern Serengeti.

Rhino surveys are in progress and the results will help determine how best to deploy available field rangers to protect the remaining animals. A formal national plan was developed from the deliberations of a special workshop held in Arusha in 1993 (attended by AfRSG members from South Africa, Kenya, Zimbabwe, and Tanzania), and was officially endorsed in 1993.

A national workshop was held in October 1998 to review and update the Tanzanian rhino policy and management plan with AfRSG members attending from Tanzania, South Africa, and Kenya. An updated policy and plan has been produced and at the time of writing still awaits formal ratification. This plan has a revised goal: ***To increase the populations of D.b. michaeli and D.b. minor to 100 individuals by the year 2018 using a metapopulation approach, and to ensure each subspecies population increases at rates of over 5% per year.***

The revised draft plan, produced as a result of the October 1998 workshop has six main sections. These deal with: coordinated management and plan implementation (to be achieved through steering and management committees, a national rhino coordinator and by regular status reporting); reducing rhino poaching through effective law enforcement; sound biological management (aimed at managing metapopulations of the two subspecies for maximum productivity within their known historic ranges); obtaining community support for, and a sense of national pride in rhino conservation (where possible enabling communities to benefit from conservation); seeking increased self-sufficiency and more sustainable funding; and building the national capacity to protect and manage the country's rhino populations.

Tanzania has appointed a national rhino coordinator, responsible for coordinating all rhino conservation activities in Tanzania in accordance with the national strategy. His tasks include undertaking surveys in the Selous Game Park, helping to revise the national strategy for conservation of the black rhino, as well as acting as the

secretariat for the National Rhino Conservation Committee. This committee comprises representatives from the three main management authorities in the country: the Tanzanian Division of Wildlife in the Ministry of Natural Resources and Tourism, Tanzania National Parks, and the Ngorongoro Conservation Area Authority.

Tanzania is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

### Conservation measures proposed

1. Establish intensive protection zones in any areas where viable numbers of rhino are found, although available manpower and budgets may limit the areas that can be protected effectively;
2. Establish a nationwide monitoring system for all black rhino populations. The new draft policy and management plan gives specific recommendations for action under each of its six main sections, for each individual population.

## Uganda

Black rhino								
1980	1984	1987	1991	1992	1993/4	1995	1997	
5	0?	-	3	0	-	-	-	
Northern white rhino								
1960	1971	1976	1981	1983	1984	1991	1995	1998
80	few	few	few	2-4	0?	-	-	-

### Species/subspecies account

#### Black rhinoceros species

In the 1970s, Uganda's black rhino population, *D.b. michaeli* was largely decimated; by 1980 there were only about five animals left and by 1984, the species was deemed nationally extinct. The decimation of Uganda's black rhinos coincided with the period of political instability in the country.

#### Northern white rhinoceros (*C.s. cottoni*):

##### Presumed Nationally Extinct

This subspecies used to range over parts of north-western Uganda until the 1960s. By 1984, it was thought to be nationally extinct.

#### Threats

Poaching, low budgets and capacity for conservation, banditry in some areas of the country.

#### Conservation measures taken

Uganda is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

### Conservation measures proposed

Uganda is keen to reintroduce rhino and a feasibility study has been undertaken (Brett 1997). It is felt however, that before re-establishment of any indigenous subspecies of rhino in Uganda is contemplated, the country needs to develop and demonstrate a capacity to manage and protect wildlife. This could be achieved through the successful reintroduction and management of other less endangered species, and/or by possibly using out-of-range but less vulnerable southern white rhino as it is of less conservation significance if the latter – most common subspecies – is poached.

## Zambia

South-central black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
2,750	1,650	>106	40?	40	33	0?	0?		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	10	6	0	–	6	5	6

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

**Presumed Nationally Extinct. IUCN Classification: Critically Endangered.**

In 1980, Zambia was a major range state for the south-central black rhino, although it is generally thought that this subspecies did not occur north of the Zambezi river. Estimated at 12,000 in 1973, the Zambian population of black rhino appears to have been wiped out by poaching, especially in Luangwa Valley. Proposed ground surveys of three areas that might still hold remnant rhino populations were never undertaken. There have been no confirmed reports of sightings or spoor for over six years, so the black rhino is probably extinct in Zambia.

#### Southern white rhinoceros (*C.s. simum*):

**Nationally Extinct/Reintroduced or Introduced into Zambia. IUCN Classification: Lower Risk – Conservation Dependent.**

It is believed that the historical range of the southern white rhino probably did not cross the Zambezi River so the recent introduction of the rhino may be out of range. Small numbers have been introduced periodically into a sanctuary in Zambia since the early 1980s. By 1991, the introduced animals had all been poached. In 1993, six more southern white rhino were introduced into one Zambian sanctuary.

### Threats

Poaching, low conservation budgets and the reluctance of field rangers to work in the field unless they are paid an allowance.

### Conservation measures taken

Zambia has had a national rhino conservation action plan for a number of years but probably no longer has any black rhinos to conserve. Very little was achieved in meeting the plan's objectives. The black rhino probably became nationally extinct *after* the plan was launched. The Zambian plan had two components:

- *Long-term objectives*: establish a national intelligence network to counter the poaching threat and to encourage community involvement in wildlife conservation.
- *Short-term objectives*: carry out a status survey to establish numbers in the key national parks and game management areas where black rhino may still occur; undertake captive breeding of both black and white rhino; establish small sanctuaries by involving private game ranchers (black rhino to be bred on behalf of the government; white rhino for ranchers' own use); and carry out anti-poaching activities.

Zambia is a signatory to the Lusaka Agreement on cooperative enforcement operations directed at the international illegal trade in wild fauna and flora.

Zambia has removed the option of a fine and made a jail sentence mandatory for those convicted of rhino-related offences.

### Conservation measures proposed

Because of the loss of its black rhino populations, Zambia has submitted a project proposal for funding that involves a survey of potential rhino areas to determine the location of any survivors.

## Zimbabwe

South-central black rhino									
1980	1984	1987	1991	1992	1993/4	1995	1997		
1,400	1,680	>1,775	1,400	425	381	315	339		
Southern white rhino									
1895	1948	1968	1984	1987	1991	1992	1993/4	1995	1997
0	0	0	200	208	250	249	134	138	167

### Species/subspecies account

#### South-central black rhinoceros (*D.b. minor*):

**IUCN Classification: Critically Endangered.**

AfRSG rating: three *key 2* populations.

Unlike all range states to the north, Zimbabwe's black rhino numbers increased during the 1970s, and by 1987 Zimbabwe was the only country with over 1,700 black rhino, accounting for almost half the world's black rhino at that time (AfRSG).

However, poaching by Zambian-based poachers escalated rapidly in the early 1990s. Despite intensive

efforts by the Zimbabwe Department of National Parks and Wild Life Management (DNPWLM) to combat poaching in the Zambezi Valley, an average of 200 black rhino a year were lost during the period of rapid decline in the 1990s (Martin 1994).

The number of black rhino dropped from an estimated 1,775 in 1987 to about 315 by 1995. In the DNPWLM estates, the number declined from an estimated 1,450 in 1989 to only 121 in 1995. This decline can be partly attributed to the translocation of animals to private land in Zimbabwe, away from Zambian poachers (Leader-Williams 1994, AfRSG data 1996). Numbers on communal land also crashed over the same period from an estimated 140 to only about four animals.

#### **Southern white rhinoceros (*C.s. simum*):**

**Nationally Extinct. IUCN Classification: Lower Risk – Conservation Dependent.**

AfRSG rating: three *important* populations.

Following reintroduction of animals from South Africa, numbers of southern white rhinos increased in the 1970s and 1980s. Poaching reduced southern white rhino numbers in Zimbabwe from a high of 250 in 1991 to 134 in 1993/4. With a reduction in poaching, numbers have since stabilised, and recently started increasing again. In 1997 Zimbabwe had 167 white rhinos, and just over a third (35%) of them were privately owned. The private sector is playing an important role in conserving the species.

#### **Threats**

Poaching, declining budgets, lack of progress in establishing national/provincial rhino management committees as proposed in the conservation plan. Also, possible future expropriation for resettlement of some private farms where black rhinos are conserved under custodianship. There has been a break in biological management activities to support metapopulation management needs.

#### **Conservation measures taken**

In 1991, in response to the worsening situation, the DNPWLM began dehorning rhino to deter poachers (du Toit 1995). In 1995–96 no black rhinos were known to have been poached and, for the first time in 10 years, numbers of black rhinos in Zimbabwe started to stabilise. Since then, numbers have been increasing rapidly in some *key* populations.

The ultimate management authority for all black rhinos remains the State, and rhinos on private land in Zimbabwe are not privately owned but are managed on a custodianship basis for the State by private landowners. A founder group of 28 *D.b. minor* was however, sold to a private conservancy in Zimbabwe in 1998. Private sector custodians have played a major role in national black rhino conservation efforts. Initially, private custodianship was seen purely as an ‘insurance policy’ for the species, and in 1989 only 9%

of the country’s rhino was held in this way. Numbers of black rhinos on private land changed little between 1989 and 1994 (160, 161), but by 1997, 65.8% (223) of Zimbabwe’s population was held in custodianship on private land – more than were conserved in State-run protected areas (116). Rhinos bought in 1998 from South Africa have been donated to the State and are being managed on a custodianship basis.

In the case of Save Valley Conservancy, the re-establishment of black rhinos helped catalyse a change of land use to game, resulting in internal farm fences and all cattle being removed from the area. Such changes have created more jobs with better wages, generated more foreign income, and are economically and ecologically more sustainable than cattle ranching in the Zimbabwe lowveld (Anon 1994b).

The private sector paying for rhino management in its areas, has enabled the DNPWLM to concentrate its efforts and limited budget on protecting remaining rhinos in intensive protection zones within its parks.

Until May 1995, black rhino management was carried out in accordance with the ‘Zimbabwe Black Rhino Conservation Strategy’ (Anon, 1992a), the ‘Short and Medium Term Action Plans for Black Rhinoceros’ (Anon, 1992b), and the ‘Black Rhino Conservation Project Emergency Plan’ (Anon, 1993). In 1995–96, changes in the DNPWLM severely disrupted rhino conservation activities and the country’s rhino action plan was suspended. In December 1996, at the request of the Zimbabwean Ministry of Environment and Tourism, the IUCN Regional Office for Southern Africa facilitated a workshop to review Zimbabwe’s rhino conservation policy. This led to the publication of the Zimbabwe Rhino Policy and Management Plan which was officially approved by the Minister of Environment and Tourism in May 1997. A positive feature of the new strategic plan is that it recognises the value of partnerships between the State and other key stakeholders in the conservation of the nation’s rhinos.

The **goal** of the 1997 plan is to:

- achieve rapid increases in Zimbabwe’s black and white rhino populations to levels of at least 2,000 individuals of each species through metapopulation management in suitable habitats throughout the country.

The plan’s **objectives** are to:

- establish a mechanism for coordinated and active management and protection of black and white rhino populations;
- secure and protect existing and new populations of rhino throughout the country;
- ensure the effective biological management of existing and new populations to achieve growth rates of at least 5% per year;
- establish and maintain effective monitoring and evaluation programmes for rhino populations;

- develop economic and social sustainability of Zimbabwe's rhino management programme;
- ensure the immediate and effective implementation, management, and monitoring of the national rhino management plan.

As in a number of other range states, a key requirement of Zimbabwe's strategy is to seek to keep populations productive by ensuring densities do not increase to a level where reproduction is impaired.

Zimbabwe has set up intensive protection zones at Sinamatella, Matobo, and Matusadona. Remaining black rhino outliers in the Zambezi Valley in Zimbabwe have been caught and consolidated in better protected populations elsewhere.

In 1996 Zimbabwe joined the Rhino Management Group, although as yet has not attended any meetings.

Zimbabwe has adopted a 'shoot-to-kill if necessary' policy when dealing with armed poachers.

#### **Conservation measures proposed**

- Establish national provincial rhino management committees with members from the Department of

National Parks and Wildlife Management and other relevant government agencies, private sector, local communities and their representative organisations, and relevant NGOs;

- Increase manpower densities in State-run intensive protection zones;
- Run a national reward system at the local level to maintain confidentiality of informers;
- Radio-collar and ear notch rhinos to help in monitoring rhino movements, de-horning and evacuation in response to emergency situations;
- Establish and support of rhino 'factories' (defined as free-ranging breeding groups of 25 founders achieving growth rates of, or exceeding, 5% per year);
- Translocation, where necessary, for demographic and genetic management reasons;
- Consider alternative use/sale options for rhino horn stocks;
- Identify, develop and implement strategies to establish and appropriately distribute benefits to local communities;
- Develop annual project implementation plans.

# Strategies for Successful Conservation of the African Rhinoceros

The ultimate indicator of the success of rhino conservation efforts and national action plans is the increase in the number of rhinos in the wild. This increase is influenced primarily by levels of illegal hunting and by rates of biological growth. These in turn are influenced by the various actions taken by local, national, and regional conservation organisations.

This chapter draws together some of the principles and strategies identified by the AfRSG and the wider conservation community as forming the key elements of successful long term rhino conservation. The following set of proven strategies is aimed at providing management authorities with guidance in developing and implementing sound rhino conservation policies and plans.

A WWF/WCS-sponsored study, "Different Approaches to Rhino Conservation in Asia and Africa: A Cost-Benefit Study" (Leader-Williams *et al.* In prep.) drew on data and expertise from many range states to determine the factors contributing to successful rhino conservation. This study provides many detailed case histories and analyses that support many of the recommended strategies in this Action Plan. AfRSG members familiar with rhino conservation

in particular range states supplied much of the data for the study.

## Surveys and ongoing monitoring of rhino populations

Establishing and maintaining a good knowledge of the rhino populations within a range state is essential for their management and protection. In some range states such as Zambia, Mozambique, Sudan, Ethiopia, and Angola, conservationists have only limited information (if any) on the numbers and distribution of the rhino populations that may exist within their boundaries. Surveys are a vital prerequisite to developing a national rhino conservation plan. Once baseline data have been collected and analysed, ongoing monitoring can build up an accurate picture of the performance of that population, forming the basis for its biological management. This knowledge is also the first line of defence against poaching, since early detection is most likely in populations that are closely monitored. A range of monitoring strategies is



Radio-tracking rhino in Garamba National Park, Democratic Republic of the Congo.

Richard Emslie

generally undertaken and the following are perhaps the most important:

### **Estimating population size at least every three years**

To assess how well a population is performing, field managers should aim to estimate population size to within 90% of the true total every year (or at least every three years). Gaining this degree of accuracy may require visual identification methods including the use of ear-notching or natural features such as ear tears, damaged tails, horn configurations, and body scars. In areas where rhino are rarely seen, more indirect approaches are being developed to use signs for identification of individual rhinos including spoor photography and analysis (Alibhai and Jewell, 1997) or DNA analysis of rhino dung (O’Ryan and Morgan-Davies, 1998).

For mark-recapture monitoring, adequate staff training will need to be given to ensure collection of accurate data, recording of sightings, and proper record keeping. Where relevant, the same attention must be paid to ‘clean’ rhino sightings (i.e. of animals not individually recognisable) as to sightings of identifiable rhino. The RHINO Bayesian Mark-Recapture software package (Emslie 1993a) can be used to estimate population sizes using ongoing rhino identification data.

If possible, a proportion of the rhino population should be marked to allow individual identification. It is recommended that all rhino immobilised for research or monitoring purposes, veterinary treatment, or translocation, be individually ear-notched as a standard practice. Where possible, microchip transponders should be implanted into the horns and shoulder of each immobilised rhino. This will allow tracking of horn should the rhino be poached, and identification of the carcass should the rhino die and its ears be scavenged.

### **Determining sex and age structure of the population**

Rhinos can be aged until they are adults (about seven years) based on their size relative to an adult (Hitchins 1970, Emslie *et al.* 1993, NPB 1994, Hillman-Smith *in litt.*, Adcock 1999b and Adcock and Emslie. In prep), and the level of horn development (Emslie *et al.* 1993, Adcock *compiler* 1997). If an animal has been immobilised or has died, tooth wear patterns can be used to age it. This method can be used for animals of all ages.

To ensure data compatibility between areas, it is strongly recommended that the adjusted Hitchins age classes (Emslie *et al.* 1993, Adcock 1997, Brooks and Adcock 1997) are used to age black rhino; and Adcock’s age classes based on the known age photographs of Owen-Smith (NPB 1994) used to age white rhino. Horn measurements can be taken from photographed, captured and dead rhino, and used to refine this age classification (Emslie *et al.* 1993, Adcock 1997, P. S. Goodman pers. comm.). Captured and dead rhino should also be aged by

tooth wear where possible (Goddard 1970, Hitchins 1978, du Toit 1986, Hillman *et al.* 1986, Morkel *in litt.*, Wucher 1994). This will improve the accuracy of age structure information, especially for adults older than about seven years. The estimated ages at death of known females can be used to investigate the effect of age on fertility in wild rhino populations, and obtain improved estimates of age/sex specific mortality rates for population modelling. Where an animal’s birth date is known, area-specific and ecotype-specific refinements to tooth wear and horn growth criteria can be made.

In smaller populations, it is also important to monitor the sex structure of a population, as reduced population growth, and in the case of black rhino, increased deaths through fighting can occur if there are too many males in a population. Similarly, knowing the proportion of breeding aged females in a population, helps interpret other population growth rate data.

### **Examining and recording all rhino mortalities**

Attempts should be made to detect and record all rhino deaths (age of animal, cause of death, how it was found, time since death, etc.). Skulls and especially horns should be collected. A standardised mortality form has been successfully used by several management authorities throughout South Africa and Namibia, and its use could extend to other range states (Emslie 1992). The form is available from the Rhino Management Group. It is published in the revised RMG South African black rhino conservation plan (Brooks and Adcock 1997).

### **Preparing annual status reports**

National status reporting is a key component of implementing a national/regional conservation strategy. The preparation of regular (preferably annual) rhino status reports allows managers to assess their reserve’s progress towards meeting national conservation goals. Status reports should supply information on population size, age, and sex structure, translocations and mortalities, as well as a number of standardised biological performance indicators (age at first calving, proportion of adult females with calves, intervals between calving, and net population growth rates).

Ideally, individual status reporting should form part of a formal and regular national or regional reporting programme. Maximum benefit can be obtained from status reporting only by compiling, synthesising, and analysing all the individual reports at a national or regional level.

Feedback from national or regional status summary reports is vital to conservation managers and staff because it places the results of individual reserve reports into a metapopulation context. It also allows the interchange of biological information and management expertise among reserves, conservation agencies, and countries. Being able to see the ‘bigger picture’ can persuade a manager of the



need or desirability to translocate animals in or out of his particular territory to meet regional or national conservation goals. Without status reporting and the production of interpreted regional/national status report summaries, a problem may remain undetected far longer than in situations where regular reporting is undertaken.

To date, organised status reporting has generally been restricted to black rhino, although it should also be used for white rhino.

## Biological management

The information gained from surveys and ongoing monitoring programmes provides managers with the necessary data to:

- improve understanding of factors affecting population performance (breeding rates, mortality, rhino distribution and social behaviour, rhino density with respect to carrying capacity, climatic events, and management decisions); and
- determine and predict progress towards conservation goals for each taxon (in terms of rhino numbers and rates of increase).

## Estimating the ecological carrying capacity of the land

A key component of all existing national rhino plans is the need to increase metapopulations as quickly as possible. Achieving and maintaining a high metapopulation growth rate can only be done if the land is not overstocked. This in turn depends on an estimate of the ecological carrying capacity (ECC) of the land. So far, more attention has been given to estimating black rhino ECC than for the white rhino. The process of estimating black rhino ECC is currently being developed. Experience has shown that non-experts tend to grossly over-estimate carrying capacity (Emslie, 1993c). Once the ECC is known, existing populations can be managed for maximum productivity and excess animals removed to enhance other populations or establish new populations as necessary. Estimation of ECC is also a necessary prerequisite for making decisions about the suitability of an area for establishing a new sub-population. Where possible, regional and national conservation plans should contain estimates of the carrying capacities of all current and potential future rhino areas (expressed as number of rhino/km<sup>2</sup>).

For large mammals like rhinos, evidence suggests that the maximum sustainable yield (commonly called maximum productivity carrying capacity or MPCC) is around 75% to 80% of estimated (long term) ECC (Hearne *et al.* 1991, McCullough 1992, N. Owen Smith quoted in Emslie 1993), although optimal stocking levels may be

lower than this during drought years. The AfRSG has provisionally adopted the figure of 75% for maximum productivity carrying capacity. If numbers increase beyond 75%, the population should comprise a high proportion of young animals (less than seven years old) and should not remain at these high levels for more than one dry season. After this, the availability of food resources will be threatened, so affecting the long term carrying capacity of the area for black rhino.

In such cases, to increase both the reserve and metapopulation's performance, managers should be prepared to remove rhino so that the population falls to 60 to 70% of ECC. Decisions on which animals to remove should consider the genetic, age and sex structure of the population.

Savannahs are highly dynamic ecosystems and vegetation changes can have marked effects, both positive and negative, on rhino carrying capacities. Negative effects may be due to heavy browsing, fire (both very high fire frequencies, severity or long intervals between fires), or simply the result of vegetation succession or other factors. Performance in a number of black rhino populations has been poor because inadequate attention has been given to ECC and stocking rates relating to rhino carrying capacity (Adcock, 1996c; Emslie 1999a).

In smaller black rhino populations (<50, and especially <20), it is probably necessary to estimate the mature male carrying capacity separately, based on expected home ranges in similar habitat, the topography of the reserve, permanent water distribution, and possibly the sequence of the animals' introduction.

## Managing rhino populations for maximum productivity

Large, healthy populations provide the best possible buffer against future poaching losses and preserve genetic diversity, or at least minimise loss of heterozygosity (Soule 1990, Gilpin 1990). To highlight the critical importance of maintaining high metapopulation growth rates, the effect of different growth rates on a hypothetical metapopulation of 100 animals is shown in figure 9.1. With a high average growth rate of 7.6% per year, numbers will treble to 300 in just 15 years and reach 433 after just 20 years; a low growth rate of 1% translates to a very small population increase (about one animal per year) and poaching of just a few animals can threaten an entire population. Figure 9.2 shows the effect of poaching outbreaks occurring every five years, with 20 rhino poached each time. The metapopulation with a 1% growth rate is reduced to 36 animals after 20 years (i.e. declines by almost two-thirds). By contrast, the population with a growth rate of 7.6% increases to 282 animals after 20 years, despite the poaching of 80 animals.

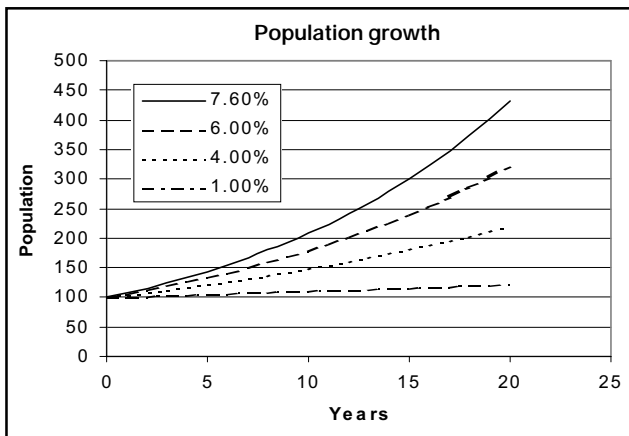


Figure 9.1. Differential growth rates in a population of 100 rhinos.

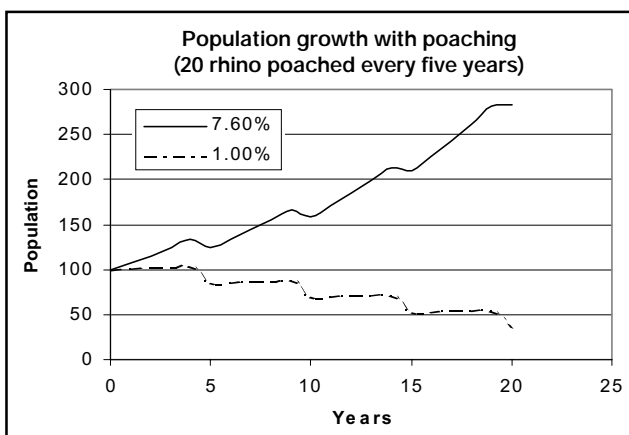


Figure 9.2. The effects of poaching on two populations with different growth rates (7.6% and 1%).

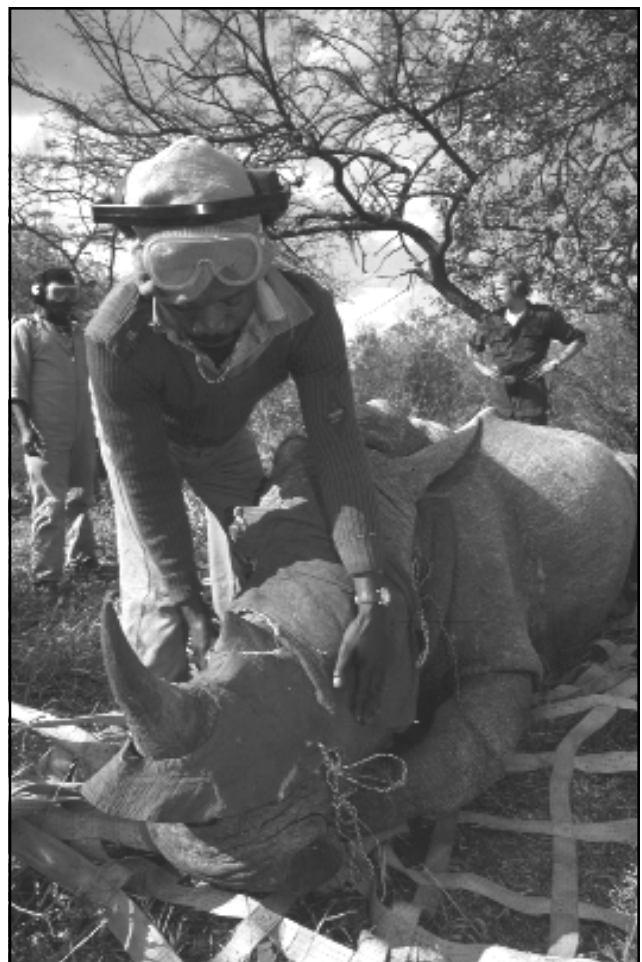
The result of poor biological performance is similar to the net effect of poaching – far fewer rhino (Emslie 1994b). With faster metapopulation growth rates, the population’s ability to withstand poaching is greatly increased.

## Establishing new populations

Establishing new discrete populations is both risky (for the new arrivals) and expensive. To avoid problems of overstocking and to increase metapopulation growth rates, rhino from well-established populations that are approaching 75% of estimated ecological carrying capacity should be translocated to suitable areas within their historical range.

The following strategies are based on many years of experience (du Toit 1995, Brett 1996, Morkel 1996) and will help reduce problems and risks for the new arrivals:

- Assess the suitability of an area before introducing rhino. The area should be rated on the basis of:
  - its estimated ecological carrying capacity (including access to permanent water sources)



KwaZulu-Natal Nature Conservation Service (KZNCS) photolibrary

Fitting a face mask onto a white rhino during preparation for translocation. Umfolozi Game Reserve.

- its management capacity (number of experienced staff, available resources, etc.)
- its socio-political situation (security of land tenure, relations with neighbouring people/communities)
- the potential predation/poaching threats, and
- the risks of contracting diseases (anthrax, trypanosomiasis).

This rating can then be used to guide and prioritise decisions on translocations.

- Introduce a large founder group of rhino (>20). This is preferable to introducing a small group, and more desirable from a genetic management perspective.
- Establish each new population as a single entity and within a short space of time. Research has shown that the risk of death is higher when individuals or small groups of animals are introduced a group at a time into established populations (Adcock, 1996, Brett 1998).
- If new rhino are to be released into an established population, ensure that the release area has a low rhino density with dispersed sources of water. It may be advisable to hold the new arrivals in a boma on site for a week or more before release and spread their dung

widely outside the boma for some time before release. The resident rhino will get used to the scent of the new arrivals, and the new rhinos will encounter their own familiar scent when they are released.

- Do not overstock areas as the risk of death will increase and breeding performance will decline at densities near to ecological carrying capacity. The higher the local (absolute) density of rhino at an introduction site, the greater these risks, and the more important it becomes that rhino should be released into areas where they can disperse easily.
- Ensure there are many sources of drinking water near the release area to help alleviate stress after introduction by minimising contact between the rhino.
- Select the animals to be translocated on the basis of their group's sex and age structure, and refer to those already at the release site.

*Sex:* in the case of black rhino, young introduced females seem to be at high risk from resident adult bulls, while young bulls are easily killed by adults unless they have space to escape. As in natural populations, male rhinos have a greater tendency to fight than females. Black rhino adult females are the best survivors while adult males and young black rhino (especially females) have the highest mortality risk (Brett, 1998, Adcock 1995a, 1996a).

*Age:* Sub-adult black rhinos should not be introduced unless all animals being introduced are sub-adults and there are no adult rhino in the destination population. Young rhinos are generally insecure and often seek the company of others which may attack the newcomers if they are not accepted into the herd. The newcomers tend to be subjected to aggressive behaviour and are easily killed by established adults. Even rhino that are five or six years old may be susceptible. If possible, do not move older animals, especially cows, aged over 15–20 years as translocation is expensive and it is logical to move animals that have a full breeding life ahead of them.

- Promote good communication and an exchange of expertise between the supplying and receiving organisation.
- Ensure that experienced rhino vets and capture teams are used to translocate rhino.
- Continually review immobilisation, translocation, introduction, and establishment procedures to minimise the risk of death and improve reproductive performance in newly-established rhino populations.<sup>1</sup>
- Monitor and record mortality of translocated animals.

*Deaths associated with translocations:* in Kenya, Namibia, Zimbabwe, and South Africa the incidence of death among translocated black rhino from capture to three months after release has been high (5–9%). Further translocated black rhino have died from mishaps such as falling from cliffs or being killed by elephant, and from fighting within two years of arriving in their new homes (Adcock 1995a, 1996a, Brett 1998). In Kenya from 1984–95 the total (non-human induced) mortality rate of translocated animals was 16% (Brett 1998). Female breeding performance has generally been sub-optimal during the first few years following introduction (Adcock 1995a, 1996a, Brett 1998). Despite these risks, there are negative consequences in not consolidating outlying rhino, leaving populations overstocked, and not moving animals under threat of poaching to areas where they can be better protected. Experience has clearly shown that despite the risks, translocation has been an essential part of any successful metapopulation management strategy. In the longer term, the international rhino conservation cost:benefit study (Leader-Williams *et al.* In prep.) found that translocated populations out-performed existing natural populations.

## Maintaining genetic diversity

The long term survival of a species depends on the maintenance of as much genetic diversity as possible. Genetic concerns in small populations relate to in-breeding and out-breeding depression, loss of genetic heterozygosity, and associated loss of potential adaptability to the environment, and disease resistance.

Rhino selected for new populations should have as little genetic similarity with the receiving population as possible. Animals should be taken from different original genetic sources. To fulfil these genetic considerations, increased liaison between the supplier/management authorities is needed to mix and match rhino where possible to form suitable breeding groups for translocated introductions.

The previously advocated rule that the minimum viable population size is 50 unrelated breeding individuals per population is no longer accepted because of the range of variables involved. In the earlier section on establishing new populations (page 64), a founder group of more than 20 rhino is recommended for establishing a new population. Population and habitat viability analyses (PHVAs) are being used to guide the process of setting targets and guidelines (Foose *et al.*, 1993, Emslie 1999). These integrate

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<sup>1</sup> The capture techniques and establishment procedures for black and white rhino have been fine-tuned over the last 35 years and are well described (Fothergill 1964; Harthoorn 1962; Kock *et al.* 1990; Kock 1992; Geldenhuys 1993; Kock 1993; Kock and Morkel 1993; Rodgers 1993a,b,c,d,e,f,g; Raath 1994; Morkel 1994; Rodgers 1994; Morkel 1996). Post-release monitoring and analysis of translocation data are also contributing to the development of improved translocation guidelines (Adcock 1995; 1996b; Brett 1998). Reviews of these procedures are currently being undertaken at national, regional and continental levels through sharing of information between members of the Rhino Management Group and the AfRSG.

and model population genetics and ecological data on specific populations with random events, to predict probabilities of population extinction under different scenarios. Small populations appear particularly vulnerable to random demographic events leading to higher rates of extinction and a greater need for introductions of rhino on both genetic and demographic grounds.

To maintain or encourage genetic diversity, the following actions are recommended:

- Manage subspecies separately until the genetic status of each has been confirmed through further studies. Populations of one subspecies in a country or region should be managed as a single metapopulation to maximise the genetic transfer and diversity within each subspecies. Protect larger populations first as these have a greater chance of survival, not only on genetic grounds, but also because they are less likely to be influenced by demographic stochasticity (random/unpredictable incidents) which is a major threat to very small populations.
- In smaller populations, remove surplus rhino to avoid inbreeding between closely related individuals.
- For each subspecies, increase the number of populations which have at least 20 founder animals to reduce potential losses through catastrophic events. Ideally, priority should be given to establishing four separate populations of each subspecies, each with ECCs allowing a minimum of 100 animals. Bigger populations have the advantage of needing less intensive (and less expensive) management per animal, an important consideration where conservation budgets are limited.
- The risk of total population extinction through disease or catastrophes should be reduced through the establishment of viable subpopulations in a diverse range of environmental situations within the historic distribution of the subspecies. Establish new populations using founder rhino from a combination of original genetic sources of the same subspecies.
- Introduce and establish one new breeding individual per generation (approximately every 12 to 17 years) into each smaller population from a different donor area. Where possible, maintain detailed stud books for all known animals in smaller populations. This should involve the entire population in the case of smaller reserves, or a subset of animals in larger populations that can act as an indicator of genetic inter-relatedness.
- Although a lower priority, monitor genetic heterozygosity in each population through DNA fingerprinting and cytogenetic studies where possible.

## Field protection of rhino populations

The protection of rhino populations from poaching is critical to successful conservation of rhinos in Africa and

Asia. To date, despite international rhino horn trade bans under CITES for over twenty years, only those populations that have been effectively protected have maintained or increased their population size. Field protection, and especially measures that increase the probability of detecting poachers *before* they kill, are critical.

The following strategies are considered to be of high priority:

### Concentrating efforts in well-protected areas

Experience has shown that it is more effective to concentrate law enforcement effort in sanctuaries, rhino conservation areas, and intensive protection zones rather than spread it too thinly across a large rhino conservation area (Leader-Williams *et al.* 1990, Leader-Williams *ed.* In prep.). Only where sufficient levels of anti-poaching effort (money, staff, and equipment) have been deployed has the incidence of poaching been significantly reduced or stopped. The international cost:benefit study (Leader-Williams *et al.* In prep.) found that staff density and budget per square kilometre were two variables strongly related to rhino conservation success.

### Consolidating vulnerable rhino populations in safer locations

The cost:benefit study found that, on average, areas centrally located within a country performed better in counteracting poaching than those on an international border and that lack of success was associated with poachers coming from outside the area (such as occurred in Kenya and in the Zambezi valley in Zimbabwe). In some instances it may be highly desirable to translocate animals from very vulnerable areas to areas that can be better protected.

### Fencing rhino sanctuaries and rhino protection areas

Rhinos that are free to roam out of protected areas are obviously at increased risk of being poached and increasing human-rhino conflict. Installing fences and patrolling them daily can give an early warning of potential intruders into a reserve.

Fencing was found to be positively associated with rhino conservation success by the cost:benefit study of differing approaches to rhino conservation. Fencing however, upsets a number of natural processes such as migration or dispersal of surplus animals, requiring increased management intervention. For example, in the Umfolozi area of Hluhluwe-Umfolozi Park, white rhinos are managed using dispersal 'sinks.' Rhino densities in these areas are kept lower than surrounding areas, providing opportunities for the natural process of the dispersal of surplus animals in surrounding areas. Translocation of the rhinos is restricted to specific peripheral dispersal sink areas.

## Dehorning to deter poaching

In cases of severe poaching threat, where staff density may be limited, dehorning may be considered as part of a protection strategy. Dehorning has been undertaken in Namibia, Zimbabwe and Swaziland. When rhinos are dehorned there is an opportunity to radio-collar them to help monitor and guide the deployment of anti-poaching patrols. The main aim of dehorning is to reduce the potential profit to poachers, and thus greatly reduce their incentive to kill rhino.

Black and white rhino horn continues to grow at an average rate of 5cm per year (Pienaar *et al* 1991), and repeated dehorning is necessary to limit the potential reward for poachers. Even when dehorning takes place, continued law enforcement effort is needed as animals may still be poached for their regrowth. Many dehorned white rhino in Hwange National Park in Zimbabwe were poached when budgetary cuts curtailed field protection efforts. Dehorning is an expensive and short term measure, which also temporarily disfigures rhino, and is therefore not used routinely in most populations. Alone it is not a solution to the poaching problem; it is only one option that may be used as part of a successful anti-poaching strategy in situations where a rhino population is severely threatened.

Extensive experience in Zimbabwe has shown that dehorning does not affect the social behaviour of rhino, and death due to dehorning is minimal (Rachlow 1997, R. F. du Toit, pers. comm.). In Sinamatella intensive protection zone, the rhino population grew rapidly between 1992 and 1995, despite being dehorned (twice) and fitted with rhino collars (R. F. du Toit pers. comm.). Alibhai *et al.* (in prep) have expressed concern that immobilisations may affect pregnancy (especially in the first trimester) and this topic requires further research.

## Law enforcement strategies

### Developing and operating intelligence networks

Experience in both Africa and Asia has shown that intelligence networks are an economical way of preventing poaching and apprehending rhino offenders (Jachmann 1998, Martin *in litt.*). Useful information enables conservation departments to be proactive, sometimes being able to wait undercover to intercept poaching gangs entering protected areas. Such work has also led to very high arrest rates for rhino crimes in South Africa. The increasing deployment of undercover wildlife investigators by many conservation departments in Africa has been a positive development in recent years.

People intent on illegally obtaining rhino horn often try to extract information from park staff about security,

numbers and whereabouts of rhino and legal horn stockpiles. Staff should be warned of this, and rewarded generously for informing park authorities of such attempts.

### Ensuring adequate provision and deployment of anti-poaching resources

Ideally, rhino conservation areas, intensive protection zones, and sanctuaries should be staffed at the level of at least one field ranger per 10–30km<sup>2</sup>. In larger reserves (>200km<sup>2</sup>), ground surveillance should be supplemented by a mobile specialist anti-poaching unit (APU) that can help in an emergency and also act as an internal check on other field ranger patrols.

Law enforcement staff will always perform best when well trained and well motivated. Motivation and commitment can be enhanced by keeping staff informed about recent developments and successes in law enforcement, and explaining how their job fits into the wider international picture of combating poachers and traffickers.

Training should cover weapons handling and maintenance, anti-poaching procedures, communications, and first aid. The development of a comprehensive anti-poaching training manual, relevant to the conditions and situations rangers are likely to encounter, can also be very useful. If emergency reaction plans are well rehearsed (e.g. on discovering an animal has been poached or finding poachers in the area), there is a good chance that poachers will be apprehended and successfully convicted. Field rangers form the vital last line of defence and often risk their lives protecting rhino and other wildlife. It is imperative that they receive due recognition from government conservation agencies and NGOs for the role they perform. They need adequate uniforms, equipment, transport, base accommodation, salaries, and appropriate conditions of service. Any decline in security patrolling through lack of funds or low morale can provide the opportunity poachers are looking for, and has the potential to undermine rhino protection efforts regionally as well as nationally.

Finally, implementation of a well-planned and supervised patrolling system is critical for the most effective deployment of staff and vehicles.

### Monitoring law enforcement

It is important to be able to assess the effectiveness of law enforcement programmes. By keeping adequate records (e.g. number of hours spent on different kinds of patrols, the areas covered, carcasses found), and mapping the location of illegal activity and the extent of the patrols, it is possible to identify strengths and weaknesses in the enforcement effort and modify strategies accordingly.

## Securing horn stockpiles

CITES Resolution Conference 9.14 recommends that all horn found, whether from dehorning operations, natural mortality or illegal activity, is registered, marked, and stored at a secure location. If possible, the rhino species, date found, cause of death, location, name of the finder, tag/transponder number, horn weight and dimensions should all be recorded for later analysis. If budgets allow, horns should be routinely tagged with microchip transponders of an approved standardised type recommended by the National Rhino Co-ordinating Committee. This is mainly so that horn can be easily and cheaply traced by police/wildlife investigators if an animal is poached in the next three to five years.

The CITES position on horn stockpiles is outlined in the CITES section on page 38.

It is recommended that legal stockpiles are randomly audited so that the effectiveness of security measures can be monitored. Horn from privately owned rhino should also be registered with government, and owners advised to secure the horn to prevent it entering the illegal market.

## Carrying out horn ‘fingerprinting’

The ability to identify the area of origin of rhino horn seized from illegal dealers and poachers could help in the fight against illegal trade. It has been established that trace elements and different isotopes are absorbed into horn through the digestive process. The ‘chemical signature’ of the horn can indicate the location of the animal’s home area (the abundance of selected trace elements and isotopes, and isotope ratios being closely linked to local climate, vegetation, geology and diet). Preliminary studies in South Africa, of horn from South Africa, Zimbabwe, Namibia and Kenya showed that samples from different areas have their own chemical ‘fingerprint’ (Lee-Thorp *et al.* 1992, Hall-Martin *et al.* 1993, Hart *et al.* 1994). The AfRSG is currently undertaking a major project (funded by WWF) to obtain and analyse samples from as many *key* and *important* populations in Africa as possible to set up a continental horn-fingerprinting database (Emslie *et al.* In prep.). The project further aims to use data from three different techniques (Mass Spectrometry Isotopic Analysis, Inductively Coupled Plasma Optical Emission Spectrometry and Laser Ablation Inductively Coupled Plasma Mass Spectrometry), to develop a forensic test to predict the probable source of illegal horn recovered by wildlife investigators and police (Hall-Martin *et al.* 1993, Hart *et al.* 1994, Lee-Thorp *et al.* 1992, Emslie 1999b, Emslie *et al.* In prep.). Preliminary analyses undertaken by the AfRSG of black rhino horn data have been encouraging, obtaining good distinction between reserves and even areas within a reserve (Emslie 1999b). Apart from being

useful in future court cases, the development of horn fingerprinting should provide a warning to some reserves that a rhino may have been poached, as well as improving knowledge of trade routes.

While many of Africa’s *key* and *important* populations have supplied samples to researchers conducting pilot studies and/or to the AfRSG’s major horn fingerprinting project (covering just over 70% of Africa’s remaining white and black rhino), horn samples are still needed for a number of rhino conservation areas. The more complete the continental horn fingerprint database the better, and if any population has not yet supplied at least five horn samples to the AfRSG attempts should be made to collect horn as soon as possible (e.g. from natural deaths or horn tips taken during translocations). Before samples are taken, the AfRSG office should be contacted for the horn sample collection protocol and data sheets.

Research at the US National Fish and Wildlife Forensic Laboratory has also demonstrated a unique pattern of keratin protein in rhino horn which might enable the identification of rhino products in Oriental medicines. This process is undergoing refinement.

## Criminal justice system

### Ensuring that penalties for rhino-related crimes are a deterrent

In range states where penalties for those convicted of rhino crimes are not commensurate with the seriousness of rhino crimes, revised legislation may be needed. Unless the sentences passed reflect the seriousness of the rhino crimes, high legislative penalties are unlikely to act as a deterrent. However, once a precedent for effective sentencing is set, it becomes easier to obtain substantial sentences (e.g. 5 to 10 years in jail rather than a \$500 fine) which then act as a deterrent for other potential offenders. A problem in many court cases is that the fines are set in local currencies that devalue rapidly against hard currencies (e.g. US dollar). Rhino horn on the other hand is sold for hard currencies. Over time a poacher may make more money by selling the horn and paying the fine and will be undeterred by the penalty.

### Investigating and prosecuting rhino crimes appropriately

The use of specialist wildlife investigators and prosecutors can help to ensure that criminals are tracked down, arrested, charged, and successfully prosecuted. The preparation of an emergency response plan in the event of a rhino-related crime being discovered (how to secure the crime scene, assignment of roles, contacts etc.) is recommended to

ensure that valuable evidence is not destroyed, and that no time is lost in the process of investigating the crime and apprehending the poachers.

In the absence of specialist prosecutors, police and wildlife investigators can help prosecutors build and plan the case. The use of expert witnesses to convince the court of the seriousness of the crime committed can also contribute towards the appropriate sentencing of offenders. For example, in a number of South African cases where expert witnesses appeared for the prosecution, sentences of those convicted were significantly increased and a precedent was set of high sentences for rhino crimes. In both South Africa and Namibia maximum sentences of 10 years and 20 years respectively, have been imposed.

### Active involvement of local communities

Conservation will fail in the long term if Africa's peoples and its politicians perceive wildlife areas and rhinos as luxuries that exist only for the enjoyment of wealthy foreigners (or white citizens), and which use valuable land for no greater benefit. Only when neighbouring communities are convinced that conserving wildlife and its habitats also brings long term social and economic benefit, will the rhino find a permanent place in modern Africa. The challenge is to develop community-based wildlife management programs that provide incentives for protecting rhinos. Where people have benefited directly from rhino conservation, through ecotourism ventures or employment in rhino monitoring and protection, the rhinos have also benefited significantly.

For example, in the Kunene region of Namibia, the Ngorongoro and the Masai Mara/Loita/Lalita regions the Save the Rhino Trust, Endangered Wildlife Trust and

WWF have for many years supported community game wardens and encouraged local participation in conservation. During this period rhino numbers have increased in these communal areas. In Kenya, WWF's Lake Nakuru Conservation and Development Project is helping to strengthen the Sanctuary's security by increasing environmental awareness among the local communities and by promoting sustainable land-use in surrounding farmland. In Zimbabwe, Save Valley Conservancy is also pioneering ways in which surrounding communities can benefit from the growth of rhino populations and other wildlife in the Conservancy, while in KwaZulu-Natal Nature Conservation Service reserves, a community levy is collected from tourists. Projects such as these promise to pioneer new directions for African rhino conservation.

Conservation strategies will, however, have to pay far more attention to the likely trade-offs that will result from integrating realistic conservation goals into the social and economic development agendas of modern Africa. In the words of WWF's Raoul du Toit, "Maximum protection of rhinos is attained when, in addition to law enforcement at the national and international levels, the rhinos are supported within a social and economic environment in which they are seen locally as assets".

The ideal outcome is a situation where rhinos are successfully protected and increase in numbers while local people benefit from, and therefore value and appreciate the animals. The cost:benefit study of differing approaches to rhino conservation in Africa and Asia (Leader-Williams *et al.* In prep.) states that success (in terms of change in rhino population sizes from the mid 1980s) was significantly related to the degree of community involvement. The study concluded that the most certain way of achieving success appeared to be a combination of a high budget with a high degree of community involvement (Leader-Williams *et al.* In prep., Dublin and Wilson 1998).



Local community members grow vegetables to sell at Hluhluwe Game Reserve restaurants.

KwaZulu-Natal Nature Conservation Service (KZN NCS) photolibrary

## Sustainable use options

As government grants for conservation continue to decline and the costs of successful rhino management rise, the discovery of new sources of funding becomes imperative. Sustainable, self-financing conservation programmes are already underway or are being considered by conservation authorities in several range states based on non-consumptive, and in some range states, consumptive uses of rhino.

Consumptive use includes trophy or sport hunting, horn harvesting, and trade in rhino products, while non-consumptive use refers to ecotourism and live sales of rhino. Revenue generated by such use is critical for economic viability and the future of rhino conservation. The annual revenue generated by use of rhinos makes a significant contribution to rhino conservation resources. Ecotourism is the most obvious and perhaps least controversial use of rhino. It can offer major benefits such as job and wealth creation to local communities as well as to rhino conservation, provided that some profit is re-invested in conservation and some is retained locally. Tourism is, however, vulnerable to the adverse effects of civil unrest or rising crime levels which can threaten future conservation income and job creation.

The success of southern white rhino conservation over the last 10 years has been due to both consumptive and non-consumptive sustainable use of the rhino. Both types of use form an integral part of several range state rhino conservation plans and strategies. One of the main goals of the Namibian rhino conservation plan is a use scheme (in accordance with CITES regulations) for black and white rhino to achieve and justify its goals of establishing

at least 2,000 black rhino and 500 white rhino. The Plan sanctions the use of tourism, limited controlled hunting, and live rhino sales to raise conservation revenue. In its 1997 Rhino Policy and Management Plan, Zimbabwe also aims to develop economic and social sustainability of its rhino management programme. It seeks to maximise non-consumptive values of rhino, to consider consumptive use where it does not interfere with breeding, and consider alternative use or sale options for rhino horn stocks.

The options of trophy hunting of post-reproductive males and the harvesting of rhino horn to supply a limited, legal trade are being used or considered by several range states. The issues are discussed in chapter 6.

Although a highly emotive and contentious practice, it should be recognised that trophy hunting has been proven (in South Africa and Namibia) to be sustainable, to create jobs, generate income, increase the incentives for private and community conservation and help subsidise the high costs of monitoring, protecting and managing rhino. From 1968 to 1996, the hunting of white rhinos in South Africa generated some US\$24 million. Since sport hunting began in earnest in 1968 the number of white rhinos in the country has more than quadrupled. Currently only about 0.6% of the South African white rhino population is hunted annually and the metapopulation grew by 6.7% per year between 1987 and 1997. Even with limited hunting, white rhinos numbers in South Africa will exceed 15,000 by 2007 if current population growth rates are maintained and sufficient habitat and incentives are available for the continued expansion of populations on private and communal land. White rhino hunting, although opposed by many, is an example of consumptive use that is clearly sustainable.



Ecotourism products. Wooden rhino carvings for sale at Hluhluwe-Umfolozi Park, South Africa.

Sue Mairika



The sale of live black and white rhinos is also practised in South Africa where individual animals fetch up to US\$30,000 at authorised game auctions. Live sales are seen as critical for successful conservation in South Africa where they provide much needed and significant revenue for State conservation agencies, as well as providing incentives for the private sector to conserve rhino.

The opening of a possible legalised trade in rhino products is perhaps the most controversial option of all for raising revenue. As rhino horn can be safely removed and grows back in time, it has been argued that South Africa alone has the potential to produce enough legal horn to meet the demand for traditional medicine and by doing so, eliminate illegal trade (see chapter 6). National rhino conservation plans and draft strategies of three southern African range states: South Africa, Namibia and Zimbabwe, which together conserve 93% of Africa's rhino, indicate a desire to investigate the option of a legal international trade (within the framework of CITES). At the 10th Conference of the Parties to CITES, South Africa also sought international approval for its efforts to investigate possible future trading as a rhino conservation measure.

The trade issue is complicated and as discussed in chapter 6, there are many arguments for and against it. Key issues that need to be considered include whether the combination of domestic and international trade bans are starting to work, the importance of revenue generation and incentives for continued successful rhino conservation, whether a legal trade could be successfully controlled, the potential impact on other taxa of rhinos, and how best to reduce illegal demand for horn and poaching pressure.

## Applied research

As donor funding is limited there is a strong case for giving applied research projects (i.e. those that have a direct impact on rhino conservation strategies) priority over basic academic research projects. Arguably, in the past, a disproportionate share of donor funding has gone to basic research. Yet applied research is a critical element of any successful rhino conservation strategy. It establishes a scientific basis for issues affecting day-to-day rhino management in the field as well as providing strategic direction on longer-term policies and approaches to rhino conservation. Rhino management authorities should develop their own list of priority research needs.

Following is a list of examples of applied research projects and their use in practical rhino conservation. This list is by no means exhaustive.

- Research into patterns of population decline, law enforcement and patrol effort. This highlights the need to concentrate law enforcement effort to achieve a specified minimum level necessary to prevent rhino

populations declining (Leader-Williams 1988, Leader-Williams *et al.* In prep, Jachmann 1998).

- Research into the dynamics of the rhino horn trade. This helps conservationists better understand the complexity of the threats to the rhinos they are protecting (Martin 1980, Martin 1983, Nowell *et al.* 1992, Leader-Williams 1992, Mills 1993, Varisco 1987, 1989 Milliken *et al.* 1993, Martin *et al.* 1997, Mills 1996, Mills 1997).
- Research into the cost:benefits of different approaches to rhino conservation in Africa and Asia (Leader-Williams *et al.* In prep).
- Horn 'fingerprinting' research – establishes the source of intercepted illegal horn (Lee-Thorp *et al.* 1992, Hall-Martin *et al.* 1993, Hart *et al.* 1994 Emslie *et al.* In prep).
- Research into the effects of management actions (e.g. bush clearing, fire, reintroduction of elephants) on vegetation dynamics and black rhino feeding ecology. This provides a better understanding of the way management action can affect rhino carrying capacity (Marchant and Pullen 1995, Emslie 1999a).
- Research into the population dynamics of rhino populations and metapopulations (Hitchins 1966, 1969, 1970, 1998, Hitchins and Brooks 1986, Hitchins and Anderson 1983, Owen Smith 1988b, du Toit 1995, Adcock 1995a, 1996a, 1996b, 1998, Emslie 1990, 1991, 1999a, Smith *et al.* 1995).
- Research into rhino feeding ecology – helps refine estimated carrying capacities which are essential for determining stocking rates to ensure maximum productivity (Goddard 1968, 1970, Hitchins 1969, Hall-Martin *et al.* 1982, Mukinya 1977, Kotze 1990, Joubert and Eloff 1971, Erb 1993, Loutit *et al.* 1987, Oloo *et al.* 1994, Owen-Smith 1988a,b, Owen-Smith and Cooper 1998, Vickery 1996, Adcock 1999a, Emslie 1999).
- Research to develop a statistical software package to enable field ecologists and managers to estimate black rhino numbers more accurately using sighting/resighting data of individuals. This has contributed to better density estimates for a number of *key* and *important* populations (Stead 1991, Emslie 1993).
- Population Viability Analyses – explores the likely consequences and risks of alternative management strategies and probable sensitivity of rhino populations to various factors such as inbreeding, translocation and increased mortality (Foose *et al.* 1993, Lacy 1992, Lacy *et al.* 1995, Lacy, *in litt.*, Emslie 1999a).
- Analysis of past data on translocations and introductions produced a set of recommended procedures to maximise the chances of success. (Brett 1993, 1998, Adcock 1995, 1996a, Adcock *et al.* 1998).
- Research to develop, refine and improve rhino capture and translocation techniques (Harthoorn 1962, Morkel 1994, 1996, *in litt.*, Raath 1994, Rodgers 1993a, b, c, d,

e, f, g, 1994, Kock 1992, 1993, Kock and Morkel 1993, Geldenhuys 1993, Galli and Flammand 1995).

- Measures of genetic heterozygosity and genetic difference between different rhino populations and subspecies (Swart 1994, Harley, pers. comm.).
- Research on the composition of wild black rhino diets and rhino reproductive behaviour – helps improve the diets of rhinos in captivity which can lead to increased breeding rates and a reduction in the number of rhinos dying in captivity (Adcock 1999b, Dierenfeld 1988, 1990).
- Research into haemolytic anaemia and other diseases affecting captive bred rhino (Chaplin *et al.* 1993, Paglia 1994, 1999).
- The potential role of plant secondary chemicals in black rhino nutrition, population performance and habitat carrying capacity (K. Adcock, in prep.).
- DNA research to develop techniques so that individuals can be identified from samples of rhino dung for use in population monitoring and enumeration (O’Ryan and Morgan-Davies 1998).

## Captive breeding

### Supporting suitable captive breeding initiatives

Before rhino from wild populations are moved to a captive breeding institution, the credentials and track record of the institution should be found to be satisfactory.

The following categories of black rhino are particularly suitable for captive breeding:

- animals unsuitable for release into the wild, e.g. young orphans, adults handicapped through injury;
- male black rhinos surplus to the breeding and genetic needs of its own and other wild populations.

Suitable financial or material benefit from the transfer should go to the source population/authority to be used in its wild black rhino conservation programmes.

For rhino not fitting the categories above (i.e. healthy sub-adult/adult rhino, especially breeding females), some conservation authorities believe that financial or material benefit should go to the source authority for use in its *in-range* wild black rhino conservation programmes.

### Supporting field rhino conservation efforts

The captive breeding community promotes and supports field conservation of wild rhinos through its educational programmes which raise awareness of the plight of the rhino. A number of organisations contribute significantly

to field conservation programmes and applied rhino research in both Africa and Asia (see Chapter 4 for examples of support).

## National plans: implementation and funding issues

### Updating rhino conservation plans

Range states with reliable population estimates and functional national or regional action plans need to keep monitoring the status of their populations as well as continually updating and revising their conservation plans. In all range states, support from the appropriate government level and from all stakeholders is needed for successful surveying, status reporting, action planning, and plan implementation.

### Using national committees to manage national rhino conservation plans

Once a plan has been adopted, national rhino management committees have proved to be a very effective way of keeping the plan on track. They can guide its implementation, monitor progress towards goals and determine necessary new directions (following monitoring and evaluation).

### Assessing and modifying current strategies

While all rhino conservationists are seeking long term solutions to ensure the continued survival and growth in numbers of the world’s rhino taxa, there are differing opinions as to the strategies most likely to lead to the successful conservation of rhinos in the longer term. The following areas require further analysis:

- the extent to which the introduction and enforcement of internal trade bans (augmenting the international trade bans under CITES) can, and may already be reducing the prices and demand for illegal horn, hence reducing the pressure of poaching;
- the extent to which recent improvements in the status of African rhino are primarily due to improved law enforcement in the many *key* and *important* populations, and to the fact that rhinos have been poached out of the highly vulnerable areas;
- whether the currently high levels of anti-poaching expenditure in many parks and on private land can be maintained in the longer term;
- whether the apparent lull in poaching is only temporary and what are its causes;

- the wisdom of continuing to maintain and enhance trade bans, as opposed to introducing a controlled trade in rhino horn.

It is hoped that ongoing studies and research can shed more light on these questions, and that future debate on rhino conservation issues will come to conclusions based on rational and unbiased evaluations of all the options available. The effectiveness of current strategies needs to be continually assessed and modified if necessary.

As Milliken *et al.* (1993) stated: “Rhinos face a grave crisis, and those who purport to hold the survival of the five species above everything else must be prepared to examine all available options with open minds and the will to seek a lasting solution”.

### **Seek adequate funding and pursue self-sufficiency**

Successful conservation of rhino in the wild is expensive – perhaps as much as \$1,000 per km<sup>2</sup> per year (Conway, *in litt.*, Herbst and Emslie, *in litt.*, Dublin and Wilson 1998, Leader-Williams *et al.*, *in prep*). Given the declining government conservation budgets across Africa, the challenge for the future is to maintain expenditure at a level sufficient to ensure successful protection and management of wild rhinos. Range states may consider developing plans for their rhino populations which include provisions for the re-investment of revenues derived from the appropriate use of rhinos, to offset the high cost of conservation and to aim towards a long term goal of self-sufficiency in their rhino conservation efforts. In some areas several of the recommendations in CITES Resolution Conference 9.14 are being implemented.

Lobbying and environmental education can play an important role in ensuring stable or increasing levels of

support and funding for conservation from government and NGOs. In southern Africa, the use of professional resource economists is proving to be effective in promoting the true value of conservation to politicians and the wider public.

### **Rating and assessing project proposals before donors decide on funding allocation**

Donor funding is critical in supporting the efforts of the main rhino conservation agencies and private owners and custodians who conserve rhino successfully but are faced with financial shortfalls. As discussed in chapter 7, donors are encouraged to consult the AfRSG over the assessment of potential projects before making final funding decisions. Projects given the status of *continental priority* and *continentally important* should have priority over *nationally important* projects, which in turn should have priority over non-rated projects.

Donors also need to remember the lesson learnt since the writing of the last Action Plan: that resources usually need to be concentrated up to at least minimum threshold levels to have a realistic chance of success. Experience shows that spreading resources thinly is likely to be ineffective, and that donor funds and effort could be more effectively employed on other projects rated as having a better chance of success. The key question donors need to ask is how much a project will contribute towards increasing rhino numbers either through reducing poaching or through sound metapopulation management.

Donors are also encouraged to focus support to ensure that at least the rated *key* and *important* populations are successfully conserved, thereby ensuring the continued survival of Africa’s rhino subspecies.

# Conclusion

Since the previous *African Elephant and Rhino Action Plan* was published in 1990 there have been many failures as well as many successes in African rhino conservation. Much has been learnt from these experiences and additional research in the field. Our understanding of the factors associated with successful rhino conservation has improved considerably, leading to the recommended strategies for successful conservation of African rhino.

There are a number of causes of optimism. Black rhino numbers have, for the first time since continental statistics were compiled, started to show a slight overall increase. Southern white rhino numbers continue to increase rapidly, and levels of poaching are generally decreasing. Over the last decade, the level and quality of monitoring and metapopulation management has improved in many areas, contributing to the increase in rhino numbers. Since publication of the previous Action Plan, all the major range states have developed national rhino conservation policies, plans and strategies, and a number of coordinating committees now implement these plans. Increased efforts have been made to empower local communities and seek their support for conservation. Following the development of the AfRSG's system of priority rating populations and projects, a number of donor agencies have made efforts to improve the selection of projects they fund, and ensure that their money is more focused and more effective. In captivity, the breeding performance of black rhinos has also started to improve. In some range states, sentences handed down to convicted rhino poachers and horn dealers have increased dramatically to a level where they now act as a significant deterrent to potential poachers. Following increased application of internal trade bans to support international trade bans under CITES, illegal demand for horn appears to have declined in some consumer countries.

Yet despite these encouraging trends, the continuing decline in state budgets for conservation is a matter of grave concern. It threatens the ability of a number of conservation agencies to maintain the resources for the levels of field protection, monitoring, and biological management necessary for successful rhino conservation. The critical importance of budgets was one of the significant factors highlighted by the international cost:benefit study of differing approaches to rhino conservation in Africa and Asia. It found that high budgets were strongly related to the degree of conservation success, as measured by changes in rhino numbers since the mid-1980s (Leader-Williams *et al.* In prep.). Well focused and increased donor support can play an important role in helping conservation agencies maintain the quality of their rhino conservation

programmes. Nonetheless, the outbreak of wars, civil unrest or economic decline in a range state can create an environment which may severely threaten even the most sincere rhino conservation efforts.

## New initiatives, possible solutions

Recently, the combined efforts of government wildlife departments, rhino specialists, private sector rhino conservationists, and non-government conservation groups have made significant advances in determining the requirements for successful rhino conservation policies and plans. The following broad goals will help guide future conservation effort:

1. With declining government funding, wildlife departments and conservation agencies are developing strategies that can lead to self-sufficiency. To be sustainable, conservation plans need provision for the reinvestment of revenues from eco-tourism and, where appropriate, from other uses of rhinos, to offset the costs of their management and protection.
2. Conservation effort is being increasingly directed towards *key* and *important* rhino populations, especially the most threatened African rhino subspecies. By prioritising action, limited resources can be used more effectively. Priorities include establishing intelligence networks, equipping, training and rewarding field rangers, securing legal horn stocks and adopting procedures to maximise the chances of prosecuting poachers and dealers.
3. Regional cooperation in subspecies metapopulation management, conservation and security has been increasing. Over the last decade, four of the six African rhino subspecies have been translocated across national boundaries. The Rhino Management Group of southern Africa and the recently-launched Southern Africa Development Community rhino programme seek to help conservation authorities evaluate, develop and implement conservation strategies and management programmes. The Rhino and Elephant Security Group of southern Africa and the Lusaka Agreement seek to improve cross-border law enforcement and anti-poaching efforts.
4. Local community and private sector participation has been identified as critical to successful long term rhino conservation. Ecotourism programmes and community-based rhino management programmes have already been established in some range states. In addition, maintaining or increasing incentives for these sectors to conserve rhino and biodiversity in general is important.

The economic value of rhinos through live sales and hunting is sometimes a greater motivating factor for protecting them than job creation, particularly in southern Africa.

5. The rhino horn trade is driven by demand generated by the consumers. We encourage a more culturally-sensitive dialogue between these consumers and the conservation community, and an evaluation of the possible dangers and potential benefits of a future opening of limited trade in rhino horn. Consumers should be encouraged to adopt alternative products, or at least to limit the quantity of horn consumed.

#### **From words to action**

By publication of this Action Plan, the IUCN/SSC hopes to inform all those in a position to help of the actions

necessary to conserve rhinos and increase their numbers. Rhino conservation is a complex field. While efforts to reduce illegal trade in rhino horn are critical, there are many other factors at work, particularly social/land use threats and the need for self-sufficiency among range states. African State conservation agencies and private sector conservationists continue to foot most of the bill for conserving the continent's rhinos, and in light of declining government grants for conservation, the increased support of NGOs is becoming more important. Donor agencies are urged to prioritise their funding and support projects that have a good chance of success. The international community must also be better informed of the actions needed for successful rhino conservation as this is essential for effectively channelling resources and effort to achieve the greatest conservation benefit.

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# IUCN Red List Categories of Threat

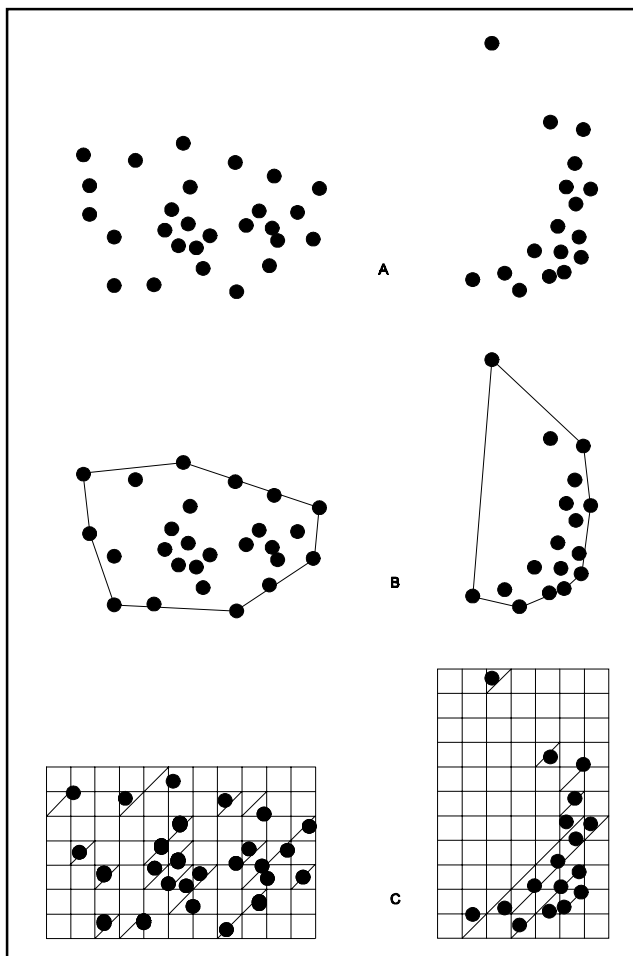
## Definitions of terms

### Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat) (but see ‘area of occupancy’). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

### Area of occupancy

Area of occupancy is defined as the area within its ‘extent of occurrence’ (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km<sup>2</sup>, and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small (see figure 2).



**Figure 2.** Two examples of the distinction between extent of occurrence and area of occupancy. (a) is the spatial distribution of known, inferred or projected sites of occurrence. (b) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (c) shows one measure of area of occupancy which can be measured by the sum of the occupied grid squares.

## IV) The Categories <sup>1</sup>

### EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

### EXTINCT IN THE WILD (EW)

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon’s life cycle and life form.

### CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) on page 84.

### ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) on pages 84–85.

### VULNERABLE (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to D) on page 85.

### LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. **Conservation Dependent (cd).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation

programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

2. **Near Threatened (nt).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
3. **Least Concern (lc).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

#### **DATA DEFICIENT (DD)**

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

#### **NOT EVALUATED (NE)**

A taxon is Not Evaluated when it has not yet been assessed against the criteria.

### **V) The Criteria for Critically Endangered, Endangered and Vulnerable**

#### **CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

- A) Population reduction in the form of either of the following:
  - 1) An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
    - a) direct observation
    - b) an index of abundance appropriate for the taxon
    - c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
    - d) actual or potential levels of exploitation
    - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.
  - 2) A reduction of at least 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.
- B) Extent of occurrence estimated to be less than 100km<sup>2</sup> or area of occupancy estimated to be less than 10km<sup>2</sup>, and estimates indicating any two of the following:

- 1) Severely fragmented or known to exist at only a single location.
- 2) Continuing decline, observed, inferred or projected, in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) area, extent and/or quality of habitat
  - d) number of locations or subpopulations
  - e) number of mature individuals.
- 3) Extreme fluctuations in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) number of locations or subpopulations
  - d) number of mature individuals.

C) Population estimated to number less than 250 mature individuals and either:

- 1) An estimated continuing decline of at least 25% within three years or one generation, whichever is longer or
- 2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
  - a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)
  - b) all individuals are in a single subpopulation.

D) Population estimated to number less than 50 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

#### **ENDANGERED (EN)**

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

- A) Population reduction in the form of either of the following:
  - 1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
    - a) direct observation
    - b) an index of abundance appropriate for the taxon
    - c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
    - d) actual or potential levels of exploitation
    - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.
  - 2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.
- B) Extent of occurrence estimated to be less than 5000km<sup>2</sup> or area of occupancy estimated to be less than 500km<sup>2</sup>, and estimates indicating any two of the following:

- 1) Severely fragmented or known to exist at no more than five locations.
  - 2) Continuing decline, inferred, observed or projected, in any of the following:
    - a) extent of occurrence
    - b) area of occupancy
    - c) area, extent and/or quality of habitat
    - d) number of locations or subpopulations
    - e) number of mature individuals.
  - 3) Extreme fluctuations in any of the following:
    - a) extent of occurrence
    - b) area of occupancy
    - c) number of locations or subpopulations
    - d) number of mature individuals.
- C) Population estimated to number less than 2500 mature individuals and either:
- 1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or
  - 2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
    - a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals)
    - b) all individuals are in a single subpopulation.
- D) Population estimated to number less than 250 mature individuals.
- E) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.

**VULNERABLE (VU)**

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

- A) Population reduction in the form of either of the following:
- 1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
    - a) direct observation
    - b) an index of abundance appropriate for the taxon
    - c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
    - d) actual or potential levels of exploitation
    - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.
  - 2) A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

- B) Extent of occurrence estimated to be less than 20,000km<sup>2</sup> or area of occupancy estimated to be less than 2000km<sup>2</sup>, and estimates indicating any two of the following:
- 1) Severely fragmented or known to exist at no more than ten locations.
  - 2) Continuing decline, inferred, observed or projected, in any of the following:
    - a) extent of occurrence
    - b) area of occupancy
    - c) area, extent and/or quality of habitat
    - d) number of locations or subpopulations
    - e) number of mature individuals
  - 3) Extreme fluctuations in any of the following:
    - a) extent of occurrence
    - b) area of occupancy
    - c) number of locations or subpopulations
    - d) number of mature individuals
- C) Population estimated to number less than 10,000 mature individuals and either:
- 1) An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or
  - 2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
    - a) severely fragmented (i.e. no subpopulation estimated to contain more than 1000 mature individuals)
    - b) all individuals are in a single subpopulation
- D) Population very small or restricted in the form of either of the following:
- 1) Population estimated to number less than 1000 mature individuals.
  - 2) Population is characterised by an acute restriction in its area of occupancy (typically less than 100km<sup>2</sup>) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.
- E) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

*Note: copies of the IUCN Red List Categories booklet, are available on request from IUCN (address on back cover of this Action Plan)*

<sup>1</sup> Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages.

## CITES Resolution of the Conference of the Parties 9.14

### **RESOLUTION OF THE CONFERENCE OF THE PARTIES Conf. 9.14:**

#### **Conservation of Rhinoceros in Asia and Africa**

DEEPLY CONCERNED that many rhinoceros populations have continued to decline drastically and that four of the five species are threatened with extinction;

RECALLING that the Conference of the Parties included all species of rhinoceros in Appendix 1 of the Convention in 1977 and adopted Resolution Conf. 3.11 on the Trade in Rhinoceros Horn (New Delhi 1981) and Resolution Conf. 6.10 on the Trade in Rhinoceros Products (Ottawa 1987);

RECALLING further that, at its eighth meeting (Kyoto 1992), the Conference of the Parties directed the Standing Committee to address rhinoceros conservation problems;

NOTING the detailed consideration given to rhinoceros conservation at the 28th (Lausanne 1992), 29th (Washington D.C. 1993), 30th (Brussels 1993) and the 31st (Geneva 1994) meetings of the Standing Committee, and the recent actions of the committee;

NOTING also the recommendations of the Animal Committee (Harare 1992, Brussels 1993);

RECALLING the resolutions and recommendations of the United Nations Environment Programme Conference between the Rhinoceros Range States, Consumer States and Donors on Financing the Conservation of the Rhinoceros (Nairobi 1993);

COMMENDING the efforts made by range states to protect their rhinoceros populations against illegal hunting, often under very difficult circumstances;

COMMENDING further the recent measures taken by countries to control and reduce use of rhino horn, especially countries where use is part of a cultural tradition extending back many centuries;

CONCLUDING that all the above measures have not arrested the decline of rhinoceros populations;

RECOGNISING that the illegal trade in rhinoceros horn is now known to be a global law enforcement problem, extending beyond the range states and traditional consuming countries;

AWARE that, given the social, economic and cultural realities in many producer and consumer States, emphasis solely on law enforcement has failed to remove the threat to rhinoceroses;

CONSCIOUS that stocks of rhinoceros horn continue to accumulate in some countries and that the call for their destruction, as recommended by Resolution Conf. 6.10, has not been implemented and is no longer considered appropriate by a number of Parties;

CONCERNED that destruction of stocks of rhinoceros horn could in all probability increase the risks to remaining rhinoceros populations;

RECOGNISING that recent international measures had a number of unintended consequences, including driving the trade further underground and have coincided with a rise in price in some consumer countries;

RECOGNISING further that there is a diversity of opinion as to the most effective approaches to the conservation of rhinoceroses in Asia and Africa;

CONCERNED that the direct threat to rhinoceros populations are not being reduced, and that the cost of ensuring adequate security for them is increasing and can not easily be met by many range states under the present conditions;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

URGES

- a) those Parties that have legal stocks of rhinoceros horn to identify, mark, register and secure all stockpiles;
- b) all Parties to implement adequate legislation, including internal trade restrictions, aimed at reducing illegal trade in rhinoceros horn;
- c) range states be vigilant in their law enforcement efforts and to place increased emphasis on the prevention of



- illegal hunting and on early detection of potential offenders;
- d) that the law enforcement cooperation between States be increased in order to curtail trafficking in rhinoceros horn; and
  - e) the consumer States to work with traditional-medicine communities and industries to develop strategies for eliminating the use and consumption of rhinoceros parts and derivatives;

**DIRECTS** the Standing Committee to continue to pursue actions aimed at reducing illegal trade, ensuring that:

- a) such activities are accompanied by evaluations of their effectiveness;
- b) standard indicators of success are developed to measure change in levels of illegal hunting and of the status of rhinoceros populations in range states; and
- c) the policies guiding interventions are responsive to the outcome of evaluations and are modified accordingly.

**RECOMMENDS** that each range state develop for its rhinoceros population a recovery plan that, *inter alia*:

- a) is appropriate for the situation in its country;
- b) will not adversely affect rhinoceros conservation in other range states;

- c) includes provision for the reinvestment of revenues derived from use of rhinoceros that is consistent with the Convention, in order to offset the high costs of their conservation; and
- d) aims toward a long term goal of sustaining, on a basis of self-sufficiency, their rhinoceros conservation efforts;

**URGES**

- a) potential donors to assist with the funding efforts of range states to implement rhinoceros recovery plans; and
- b) the Global Environment Facility to fund the protection of rhinoceros populations within the context of broadly based projects for the conservation of biological diversity;

**CALLS** for constructive engagement amongst all Parties to the Convention to achieve the aims of this Resolution; and

**REPEALS** the Resolutions listed hereunder:

- a) Resolution Conf. 3.11 (New Delhi 1981) – Trade in Rhinoceros Horn, and
- b) Resolution Conf. 6.10 (Ottawa 1987) – Trade in Rhinoceros Products.

# AfRSG Priority Categorisation of Project Proposals

## Project proposal formats

Project proposals can be submitted to the AfRSG using standardised formats available from the AfRSG, or those of major donor agencies

Rhino conservation projects or programmes requiring external funding and which have been submitted to the AfRSG (often by donors who have been approached for funding) may be rated for placement in one of the categories below, which are listed in order of priority.

- **Continental Priority (P)**
- **Continentially Important (I)**
- **Nationally Important (N)**

In some cases, documentation may be incomplete, or it may not be possible at the time of writing to rate a project. However, provided they have the potential to be rated as P, I or N, projects can be rated as:

- **Not yet rated (NR)**

Projects which do not qualify for any of the above four categories (P, I, N or NR) because they are not of sufficient priority, will not be listed or actively promoted by the AfRSG.

Projects submitted to the AfRSG are evaluated by the Chairman of the AfRSG and/or the Scientific Officer, where possible in consultation with:

- an AfRSG member with relevant knowledge of the issue and/or country concerned; and
- the AfRSG country representative concerned, if the representative did not submit the proposal.

Potential sponsors wanting a detailed and critical evaluation and priority rating of any particular project proposals should contact the Chairman of the AfRSG.

## 1. Continental Priority projects (P)

These projects are considered essential to secure the survival of the six subspecies of black and white rhino in Africa and are therefore accorded the highest priority. The project must either:

- a) be linked to a *key* population and
  - be of *immediate* significance to long term taxon survival;
  - ensure the population's stability or increase;

- include demonstrated commitment through active involvement by the relevant management authority (government, landowners, custodians, etc.) in the project;
- enhance local capacity for rhino conservation;
- follow a conservation model appropriate for the situation;

or

- b) address a national or international issue that is extremely important to the long term survival of the taxon.

## 2. Continentially Important projects (I)

The project must be linked to, or involve the creation of, a 'key' population, or an 'important' population that has an ecological carrying capacity of 50+ rhino. It must either:

- a) • be important to taxon survival in the *medium to long term*, or involve a discrete area with very large ecological carrying capacity (e.g. >500 rhino)
  - ensure population stability or increase;
  - include demonstrated commitment through active involvement by the relevant management authority (government, landowners, custodians etc.) in the project;
  - enhance local capacity for rhino conservation;
  - follow a conservation model appropriate for the situation;

or

- b) • address a national or international issue that is important to the long term survival of the taxon.

## 3. Nationally Important projects (N)

These projects do not fulfill the criteria required for priority (P) or important (I) continental projects, but are considered important for rhino survival and viability within individual historical rhino range states. Each AfRSG country representative will rank the five most preferred rated projects in priority order.

The following projects will qualify:

- surveying rhino numbers and distribution within the country
- drafting and adoption of country action plan for rhinos.

In addition, given adoption of an appropriate plan, any project will qualify providing that it is considered important

to the achievement of the rhino conservation goals for the country (i.e. it involves the creation, maintenance, or protection of at least one discrete population with the potential for at least 20 founder rhino).

- Some aspects of the project are not recommended by the assessment team for funding.
- In principle, the assessment team supports the project, but recommends that an updated project proposal be submitted.

#### **4. Not Rated (NR)**

This final category is for projects that potentially meet the necessary criteria for rating but require a revised proposal or project summary. This may be due to insufficient information or inadequate or inappropriate motivation in the original project description and summary received by the AfRSG.

#### **Annotations to ratings**

Some projects will be annotated as follows:

- More detail is required to justify requested funding level; or, in the opinion of the assessment team, the funding level requested is too high.

#### **Procedure for making donors aware of rated projects**

Potential donors need to be made aware of projects requiring funding and their AfRSG priority ratings. The AfRSG encourages proposal authors to develop standardised one-page summaries for each project. The rationale and objectives section of the summary document gives proposers a chance to 'sell' their project by briefly explaining what the project intends to do and how it will further rhino conservation. Interested donors can then read the full project proposal for further detail.

# IUCN/SSC Action Plans for the Conservation of Biological Diversity

*Action Plan for African Primate Conservation: 1986-1990.* Compiled by J.F. Oates and the IUCN/SSC Primate Specialist Group, 1986, 41 pp. (Out of print.)

*Action Plan for Asian Primate Conservation: 1987-1991.* Compiled by A.A. Eudey and the IUCN/SSC Primate Specialist Group, 1987, 65 pp. (Out of print.)

*Antelopes. Global Survey and Regional Action Plans. Part 1. East and Northeast Africa.* Compiled by R. East and the IUCN/SSC Antelope Specialist Group, 1988, 96 pp. (Out of print.)

*Dolphins, Porpoises and Whales. An Action Plan for the Conservation of Biological Diversity: 1988-1992.* Second Edition. Compiled by W.F. Perrin and the IUCN/SSC Cetacean Specialist Group, 1989, 27 pp. (Out of print.)

*The Kouprey. An Action Plan for its Conservation.* Compiled by J.R. MacKinnon, S.N. Stuart and the IUCN/SSC Asian Wild Cattle Specialist Group, 1988, 19 pp. (Out of print.)

*Weasels, Civets, Mongooses and their Relatives. An Action Plan for the Conservation of Mustelids and Viverrids.* Compiled by A. Schreiber, R. Wirth, M. Riffel, H. van Rompaey and the IUCN/SSC Mustelid and Viverrid Specialist Group, 1989, 99 pp. (Out of Print.)

*Antelopes. Global Survey and Regional Action Plans. Part 2. Southern and South-central Africa.* Compiled by R. East and the IUCN/SSC Antelope Specialist Group, 1989, 96 pp. (Out of print.)

*Asian Rhinos. An Action Plan for their Conservation.* Compiled by Mohd Khan bin Momin Khan and the IUCN/SSC Asian Rhino Specialist Group, 1989, 23 pp. (Out of print.)

*Tortoises and Freshwater Turtles. An Action Plan for their Conservation.* Compiled by the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, 1989, 47 pp.

*African Elephants and Rhinos. Status Survey and Conservation Action Plan.* Compiled by D.H.M. Cumming, R.F. du Toit, S.N. Stuart and the IUCN/SSC African Elephant and Rhino Specialist Group, 1990, 73 pp. (Out of print.)

*Foxes, Wolves, Jackals, and Dogs. An Action Plan for the Conservation of Canids.* Compiled by J.R. Ginsberg, D.W. Macdonald, and the IUCN/SSC Canid and Wolf Specialist Groups, 1990, 116 pp.

*The Asian Elephant. An Action Plan for its Conservation.* Compiled by C. Santiapillai, P. Jackson, and the IUCN/SSC Asian Elephant Specialist Group, 1990, 79 pp.

*Antelopes. Global Survey and Regional Action Plans. Part 3. West and Central Africa.* Compiled by R. East and the IUCN/SSC Antelope Specialist Group, 1990, 171 pp.

*Otters. An Action Plan for their Conservation.* Compiled by P. Foster-Turley, S. Macdonald, C. Mason and the IUCN/SSC Otter Specialist Group, 1990, 126 pp.

*Rabbits, Hares and Pikas. Status Survey and Conservation Action Plan.* Compiled by J.A. Chapman, J.E.C. Flux, and the IUCN/SSC Lagomorph Specialist Group, 1990, 168 pp.

*Insectivora and Elephant-Shrews. An Action Plan for their Conservation.* Compiled by M.E. Nicoll, G.B. Rathbun and the IUCN/SSC Insectivore, Tree-Shrew and Elephant-Shrew Specialist Group, 1990, 53 pp.

*Swallowtail Butterflies. An Action Plan for their Conservation.* Compiled by T.R. New, N.M. Collins and the IUCN/SSC Lepidoptera Specialist Group, 1991, 36 pp.

*Crocodiles. An Action Plan for their Conservation.* Compiled by J. Thorbjarnarson, H. Messel, F.W. King, J.P. Ross and the IUCN/SSC Crocodile Specialist Group, 1992, 136 pp.

*South American Camelids. An Action Plan for their Conservation.* Compiled by H. Torres and the IUCN/SSC South American Camelid Specialist Group, 1992, 58 pp.

*Australasian Marsupials and Monotremes. An Action Plan for their Conservation.* Compiled by M. Kennedy and the IUCN/SSC Australasian Marsupial and Monotreme Specialist Group, 1992, 103 pp.

*Lemurs of Madagascar. An Action Plan for their Conservation: 1993-1999.* Compiled by R.A. Mittermeier, W.R. Konstant, M.E. Nicoll, O. Langrand and the IUCN/SSC Primate Specialist Group, 1992, 58 pp. (Out of print.)

*Zebras, Asses and Horses. An Action Plan for the Conservation of Wild Equids.* Compiled by P. Duncan and the IUCN/SSC Equid Specialist Group, 1992, 36 pp.

*Old World Fruit Bats. An Action Plan for their Conservation.* Compiled by S. Mickleburgh, A.M. Hutson, P.A. Racey and the IUCN/SSC Chiroptera Specialist Group, 1992, 252 pp. (Out of print.)

*Seals, Fur Seals, Sea Lions, and Walrus. Status Survey and Conservation Action Plan.* Peter Reijnders, Sophie Brasseur, Jaap van der Toorn, Peter van der Wolf, Ian Boyd, John Harwood, David Lavigne, Lloyd Lowry, and the IUCN/SSC Seal Specialist Group, 1993, 88 pp.

*Pigs, Peccaries, and Hippos. Status Survey and Conservation Action Plan.* Edited by William L.R. Oliver and the IUCN/SSC Pigs and Peccaries Specialist Group and the IUCN/SSC Hippo Specialist Group, 1993, 202 pp.

*The Red Panda, Olingos, Coatis, Raccoons, and their Relatives. Status Survey and Conservation Action Plan for Procyonids and Ailurids.* (In English and Spanish) Compiled by Angela R. Glatston and the IUCN/SSC Mustelid, Viverrid, and Procyonid Specialist Group, 1994, 103 pp.

*Dolphins, Porpoises, and Whales. 1994–1998 Action Plan for the Conservation of Cetaceans.* Compiled by Randall R. Reeves and Stephen Leatherwood together with the IUCN/SSC Cetacean Specialist Group, 1994, 91 pp.

*Megapodes. An Action Plan for their Conservation 1995–1999.* Compiled by René W.R.J. Dekker, Philip J.K. McGowan and the WPA/Birdlife/SSC Megapode Specialist Group, 1995, 41 pp.

*Partridges, Quails, Francolins, Snowcocks and Guineafowl. Status survey and Conservation Action Plan 1995–1999.* Compiled by Philip J.K. McGowan, Simon D. Dowell, John P. Carroll and Nicholas J.A. Aebischer and the WPA/BirdLife/SSC Partridge, Quail and Francolin Specialist Group. 1995, 102 pp.

*Pheasants: Status Survey and Conservation Action Plan 1995–1999.* Compiled by Philip J.K. McGowan and Peter J. Garson on behalf of the WPA/BirdLife/SSC Pheasant Specialist Group, 1995, 116 pp.

*Wild Cats: Status Survey and Conservation Action Plan.* Compiled and edited by Kristin Nowell and Peter Jackson and the IUCN/SSC Cat Specialist Group, 1996, 406 pp.

*Eurasian Insectivores and Tree Shrews: Status Survey and Conservation Action Plan.* Compiled by David Stone and

the IUCN/SSC Insectivore, Tree Shrew and Elephant Shrew Specialist Group. 1996, 108 pp.

*African Primates: Status Survey and Conservation Action Plan* (Revised edition). Compiled by John F. Oates and the IUCN/SSC Primate Specialist Group. 1996, 80 pp.

*The Cranes: Status Survey and Conservation Action Plan.* Compiled by Curt D. Meine and George W. Archibald and the IUCN/SSC Crane Specialist Group, 1996, 401 pp.

*Orchids: Status Survey and Conservation Action Plan.* Edited by Eric Hágsater and Vinciane Dumont, compiled by Alec Pridgeon and the IUCN/SSC Orchid Specialist Group, 1996, 153 pp.

*Palms: Their Conservation and Sustained Utilization. Status Survey and Conservation Action Plan.* Edited by Dennis Johnson and the IUCN/SSC Palm Specialist Group, 1996, 116 pp.

*Conservation of Mediterranean Island Plants. 1. Strategy for Action.* Compiled by O. Delanoë, B. de Montmollin, L. Olivier and the IUCN/SSC Mediterranean Islands Plant Specialist Group, 1996, 106 pp.

*Asian Rhinos: Status Survey and Conservation Action Plan* (Second edition). Edited by Thomas J. Foose and Nico van Strien and the IUCN/SSC Asian Rhino Specialist Group, 1997, 112 pp.

*Wild Sheep and Goats and their relatives: Status Survey and Conservation Action Plan.* Edited by David M. Shackleton and the IUCN/SSC Caprinae Specialist Group, 1997, 390 pp.

*The Ethiopian Wolf: Status Survey and Conservation Action Plan.* Compiled and edited by Claudio Sillero-Zubiri and David Macdonald and the IUCN/SSC Canid Specialist Group, 1997, 123pp.

*Cactus and Succulent Plants. Status Survey and Conservation Action Plan.* Compiled by Sara Oldfield and the IUCN/SSC Cactus and Succulent Specialist Group, 1997, 212 + x pp.

*Dragonflies. Status Survey and Conservation Action Plan.* Compiled by Norman W. Moore and the IUCN/SSC Odonata Specialist Group, 1997, 28 + v pp.

*The African Wild Dog. Status Survey and Conservation Action Plan.* Compiled and edited by Rosie Woodroffe, Joshua Ginsberg and David Macdonald and the IUCN/SSC Canid Specialist Group, 1997, 166 pp.

*Tapirs: Status Survey and Conservation Action Plan.* Compiled and edited by Daniel M. Brooks, Richard E. Bodmer and Sharon Matola and the IUCN/SSC Tapir Specialist Group, 1997, viii + 164 pp.

*Grebes: Status Survey and Conservation Action Plan.* Compiled by Colin O'Donnel and Jon Fjeldså and the IUCN/SSC Grebe Specialist Group, 1997, vii + 59 pp.

*Crocodiles: Status Survey and Conservation Action Plan, 2nd Edition.* Edited by J. Perran Ross and the IUCN/SSC Crocodile Specialist Group, 1998, viii + 96 pp.

*Hyaenas: Status Survey and Conservation Action Plan.* Compiled by Gus Mills and Heribert Hofer and the IUCN/SSC Hyaena Specialist Group, 1998, vi + 154 pp.

*North American Rodents: Status Survey and Conservation Action Plan.* Compiled and edited by David J. Hafner, Eric Yensen, Gordon L. Kirkland Jr., and the IUCN/SSC Rodent Specialist Group, 1998, x + 171 pp.

*Deer: Status Survey and Conservation Action Plan.* Compiled by C. Wemmer and the IUCN/SSC Deer Specialist Group, 1998, vi + 106 pp.

*Bears: Status Survey and Conservation Action Plan.* Compiled by C. Servheen, H. Herrero and B. Peyton and the IUCN/SSC Bear and Polar Bear Specialist groups, 1998, x + 306 pp.

*Conifers: Status Survey and Conservation Action Plan.* Compiled by A. Farjon and C.N. Page and the IUCN/SSC Conifer Specialist Group, 1999, ix + 121 pp.

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