

# THE POPULATION STATUS OF RHINOCEROSSES

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## Abstract

Clearly, rhinoceroses are one of the most endangered taxa of “charismatic megavertebrates” in the world. Due to poaching and habitat destruction, nearly all wild rhinoceros populations have suffered dramatic declines and are in crisis. About 12,000 rhinoceroses of all species survive in the wild and over 50% are white rhinoceroses (*Ceratotherium simum simum*) in South Africa (see Table 1).<sup>2</sup> Currently about 1000 rhinoceroses are maintained in captivity--about 8% of all living rhinoceroses. Again, over 50% of this population is southern white rhinoceroses (see Table 2).<sup>2</sup>

## Resumen

Definitivamente, el rinoceronte es uno de los taxones más amenazados entre los megavertebrados carismáticos del mundo. Debido a la invasión y destrucción de su hábitat casi todas las poblaciones de rinocerontes salvajes han sufrido una declinación dramática, encontrándose actualmente en una situación crítica. Cerca de 12,000 rinocerontes de todas las especies sobreviven en estado salvaje y cerca del 50% son rinocerontes blancos (*Ceratotherium simum simum*) de Sudáfrica. Actualmente cerca de 1,000 rinocerontes son mantenidos en cautiverio (cerca del 8% del total de los rinocerontes). Dentro de esta población el 50% son rinocerontes blancos de Sudáfrica.

## Wild Populations

Poaching remains the major threat to wild rhinoceros populations. Additionally, the status of the Sumatran rhinoceros (*Didermocerus sumatrensis*) is further endangered by habitat destruction due to logging. Poaching is driven by the demand for rhinoceros horn, creating prices that rival those of gold on a per ounce basis. The result is a market with economic forces similar to those in the drug trade, e.g., hazards of poaching, even in countries with “shoot-on-site” policies are worth the risk. Currently, the majority of the horn goes to the Asian pharmaceutical trade where it is used in anti-pyretic and anti-inflammatory medications. A smaller market exists in some areas, most notably Gujarat state of India, for rhinoceros horn as an aphrodisiac.

The results of the demand have been dramatic - the 60,000 black rhinoceroses (*Diceros bicornis*) in 1970 sub-Saharan Africa have been reduced to 2500, the northern white rhino population has been reduced to a mere 31, the Sumatran rhino has been decimated to fewer than 500 on the verge of extinction, and both the Indian and Javan rhinos are under constant and perhaps increasing challenge. The southern white rhino has been the least affected although locally some populations

have been heavily poached.

Currently in the wild, the most numerous black rhinoceros populations are in southern Africa: South Africa (over 1000), Namibia (600+), and Zimbabwe (300). Eastern Africa, most notably Kenya has another approximately 600 black rhinoceroses. The most successful programs for protection of rhinoceroses in East Africa have involved maintaining populations in small, fenced ranches and parks that are heavily protected.<sup>5</sup> In Zimbabwe, rhinoceros protection has also adopted a sanctuary policy on both governmental and private lands. Additionally, Zimbabwe has been a leader in a dehorning program designed to remove the poacher's primary motive for killing; however, some poaching of even dehorned individuals has taken place.

The southern white rhinoceros populations exist almost wholly in South Africa. What had been the largest population outside South Africa, the 100 animals in Hwange National Park in Zimbabwe, has been severely reduced by poaching. In South Africa, the population has reached 6500+ animals from a low of fewer than 100 in the 1920s. The story of this program, centered at Umfuluzi/Hluhluwe Reserves in Natal is one of the classic conservation success stories of the early part of this century. However, the future of this species is also dependent on the stability and protection of one government. At the present time, the northern white rhinoceros (*C. s. cottoni*) is known to exist in the wild only in Garamba National Park in Zaire. Currently there are 30 animals, up from fewer than 15 individuals 10 yr ago.

Greater Asian one-horned rhinoceros (*Rhinoceros unicornis*) populations are split between India (~1600) and Nepal (~500). Populations continue to increase at a modest rate, although poaching pressures in both countries are significant. In addition to shooting, poaching there has included poisoning and even electrocution (hanging wires down from high tension lines).

In the same genus, is the Javan rhinoceros (*Rhinoceros sondaicus*). Before 1994, this species was thought to be limited to 50-60 individuals in Ujung Kulon National Park in Indonesia. However, in 1995 evidence arose that there may be a small (estimated at ~10 individuals) remnant mainland population in a remote area of southern Vietnam.

Lastly, is the Asian two-horned or Sumatran rhinoceros. This species is found both on Sumatra and in peninsular (mainland) Malaysia. At approximately 500 kg, it is the smallest of the rhinoceros species. Fewer than 800 individuals exist and they are severely threatened by both poaching and habitat destruction from logging.

At the present time, all trade in rhinoceros horn and other parts is banned under the Convention on the International Trade in Endangered Species (CITES). However, the southern African states (South Africa, Zimbabwe, and Botswana) have argued for a controlled trade feeling that sustainable use is preferable to the present market. That debate is ongoing. An excellent reference for those interested in this discussion is the book, *At the Hand of Man*, by Raymond Bonner.<sup>1</sup>

### **Captive Populations**

Four of the five recognized species are currently held in captivity (only the Javan rhinoceros

[*Rhinoceros sondaicus*] is absent). Coordinated regional and international management plans are in progress for each species of rhinoceroses in captivity.<sup>2</sup> Worldwide, captive populations of rhinoceroses are managed under the direction of a Global Captive Action Plan (GCAP) and its Global Animal Survival Plan (GASP) established under the World Conservation Union's (WCU, formerly the IUCN) Conservation Breeding Specialist Group (CBSG).<sup>2</sup>

In these captive programs, each African rhinoceros species is managed as two subspecies: the Eastern (*D. b. michaeli*) and Southern (*D. b. minor*) black rhinoceros and the southern (*C. s. simum*) and northern (*C. s. cottoni*) white rhinoceros. The two Asian species in captivity, the greater Asian one-horned rhinoceros (*Rhinoceros unicornis*) is managed as a single species while the Sumatran rhinoceros (*Didermocerus sumatrensis*) is currently being managed more or less as two subspecies (*Dicerorhinus sumatrensis sumatrensis* and *Dicerorhinus sumatrensis harissoni*).

One example of a regional management plan would be the North American Species Survival Plans (SSPs) and the individual SSPs are coordinated by the Rhinoceros Taxon Advisory Group (TAG). Each SSP Committee and the TAG designates advisors from the zoo, academic and field biology communities to address specific needs, e.g., veterinary medicine, nutrition, and research (see Table 3). The goal of these captive management plans is to maintain rhinoceros populations that are demographically and genetically viable. All rhino in captivity are considered to be under a demographic imperative, i.e., demographic considerations are more important than genetic concerns in management at this time. The emphasis is on reproduction with the goal of ensuring that the captive populations are self-sustaining. Genetic goals and guidelines are still important where they do not conflict with the demographic ones. In general, the genetic goal is to preserve in the captive populations 90% of the average gene diversity that occurs in the wild populations for 100-150 yr (i.e., 7-10 rhino generations.).

In designing a program to fulfill these goals, each rhinoceros species and subspecies represents unique challenges that will be discussed below. The genealogy of each species is maintained via a studbook. Table 3 lists the location and keeper for each studbook.

Worldwide, there are currently 700-900 African rhinoceroses in captivity (220-225 black and 500-700 white rhinoceroses). The uncertainty derives from incomplete reporting to the studbooks. There are 134 greater one-horned Asian and 21 Sumatran rhinoceroses in zoological parks. One goal of the regional management programs is to develop target populations of 1000 rhino in 10 yr and 1700 in 100 yr distributed among the various species as indicated in Table 4. This will be done primarily through captive reproduction. The allocation of space among species and subspecies will be reconfigured as indicated in Table 4.<sup>2</sup>

Indeed, the spaces occupied by these rhinoceroses are often interchangeable. Thus, one role of the TAG is coordination of efforts and spaces of all rhinoceros facilities in North America.

#### Eastern Black Rhinoceros (*D. b. michaeli*)

There are 155 definite and 21 probable individuals of the eastern black rhinoceros subspecies in world zoological collections with 68 in SSP facilities in North America. The current world

population has a relatively good founder base. In North America 80% of the population is captive-born. The present rate of reproduction appears adequate for maintaining a stable or slowly increasing population; however, there are several management and demographic problems that are cause for concern. Disease has been a major factor limiting the growth of this population (see next section) and the population has an undesirable age and sex structure. In North America, in any given year, approximately 15% of the adult females give birth (65% of all adult females have produced calves). However, 66% of adult females are greater than 22 yr of age, and presumably past their breeding prime (a recent calf born to a 31-yr-old female at the Sedgwick County Zoo in Wichita, Kansas exceeded the previous record of a 27-yr-old dam).

One impediment to population growth has been prolonged intercalving intervals in captivity.<sup>8</sup> It has been estimated that the use of early weaning and other management techniques that allow for earlier introduction of the male, may reduce the intercalving interval to 24-30 mo from the present 40 mo. This situation would approach intercalving intervals seen in the wild. Thus production could be doubled from the present group of proven breeder females. By the year 2000, the African Rhino GCAP recommends expansion of the world population to 200 animals with 90 as the target for the American Zoo and Aquarium Association (AZA) SSP Masterplan population.

#### Southern Black Rhinoceros (*D. b. minor*)

Forty-seven animals of the southern subspecies are maintained in captivity with 29 in SSP facilities in North America. The largest populations are in North America and Australia. Of note are several ranch facilities in Texas that hold the southern subspecies as part of a cooperative effort with the AZA's SSP program. The majority of 43 southern black rhinoceroses that have been imported into captivity over the past 10 yr have been from Zimbabwe with a few from South Africa. A complication of this program has been the death of 30% of the last 20 animals imported from Zimbabwe within 6 mo of arrival (losses after that period appear to be unremarkable). These deaths may have been due to stress and possibly toxic factors such as creosote<sup>4</sup> that can be avoided in the future. The population currently exhibits a desirable age distribution with majority of the animals in their breeding prime. Twenty-seven percent of the population is captive-bred and born, and when animals that arrived pregnant are included, approximately 60% of the females are proven breeders. At the present time, it appears the population has a good start towards becoming self-sustaining. As with the eastern subspecies, it is a goal to maintain a 30 mo intercalving interval.<sup>8</sup> The target population goal of the Rhino GCAP is 80 individuals by the year 2000 while the AZA SSP Rhino Masterplan recommends that this subspecies be expanded to 50 animals in North America by that time.<sup>2</sup>

#### Southern White Rhinoceros (*C. s. simum*)

Currently there are 500-700 southern white rhinoceroses in captivity worldwide with about 125 in SSP facilities in North America. Although there was a dramatic influx of founder animals from Natal in the 1970s, many of these animals have not bred in captivity and are now growing senescent. The limited founder base is compounded by over-representation of a few individuals (75% of the F1

generation in North America was sired by one male).<sup>7</sup> The most successful captive breeding situations have occurred when a single or several males were grouped with multiple females. Breeding has also taken place in pairs when animals were introduced in adulthood, or when previously platonic pairs were moved to new environments. In an attempt to increase the founder representation of this aging population, preference has been given to moving nulliparous animals to successful breeding groups. The Rhino GCAP has a goal of 515 southern white rhinoceroses in institutions by the year 2000 with 120 as the SSP target for the same time frame.<sup>2,7</sup>

#### Northern White Rhinoceros (*C. s. cottoni*)

The status of the captive population of the northern white rhinoceros is ominous.<sup>2</sup> Only 9 individuals, nearly all of which are 20+ yr of age, are held in captivity. At the present time the status and future of these animals is uncertain. Intensive efforts are underway to evaluate and manipulate these animals reproductively to induce breeding. Additionally, scenarios are being explored to combine some or all of the captive animals, augmented by a few from Garamba National Park, in an environment more conducive to breeding.

#### Great Asian one-horned rhinoceros (*Rhinoceros unicornis*)

There are 134 greater Asian one-horned rhinoceroses in captivity. This population is primarily based in zoos in Europe, North America and India. In general the population is self-sustaining and the global plan is for 145 in zoological parks by the year 2000 with 50 the designated target for the AZA SSP population. Medical problems of this species in captivity are limited, although they do seem to have a higher incidence of abortion/stillbirth, foot problems and uterine leiomyomas than other rhinoceros species.

#### Sumatran rhinoceros (*Didermocerus sumatrensis*)

There are currently 21 Sumatran rhinoceroses in captivity. Captive management of this species has been complicated by a high death loss in captivity and a failure of these animals to breed in captivity outside of their range states. The North American population currently consists of 3 animals, all housed at the Cincinnati Zoo. There is a goal of 32 captive Sumatran rhinoceroses in captivity worldwide by the year 2000 to be achieved by reproduction of the current 21. A major initiative for attempted remediation of the poor performance of the captive programs is development of managed breeding centers in native habitat in Indonesia and Malaysia, to which individuals currently in captivity would be repatriated.

### *GENERAL MANAGEMENT*

Management of each species is dependent on the characteristics of that species. For example, black rhinoceroses are generally housed in pairs or trios that are often kept separate outside of the breeding season. This is similar to their natural behavior in the wild. In contrast, white rhinoceroses are compatible in herd situations, and predictable breeding only occurs in larger groups of animals. Again, this mimics their wild behavior. Animals in breeding situations should preferably have a large yard, and if not, "run-around" capabilities so that a mate may not be trapped in a "blind"

corner. This is particularly important with black, greater one-horned Asian and Sumatran rhinoceroses in which breeding behavior is often combative.

For all rhinoceros species, adequate space is a must, and the large and potentially destructive nature dictates heavily barred or moated enclosures. Wood treated with creosote or its derivatives should never be used in the construction of rhinoceros enclosure. In colder climates, supplemental heat must be provided if there is prolonged exposure to subfreezing temperatures. When bars are used they should be vertical as horizontal bars present a higher risk of horn breakage if caught under the crossbars.

A manual that reviews the overall management of these species is in preparation.<sup>3</sup>

### *VETERINARY CONCERNS*

Many of the medical conditions of rhinoceroses are similar to those of the horse. One example is the gastrointestinal system. Rhinoceroses can experience colic, up to and including intestinal torsions. A bibliography reviewing rhinoceros veterinary literature exists.<sup>6</sup>

All rhinoceroses should be checked for gastrointestinal parasites and treated accordingly. In general, once free of parasitic infection, reoccurrence is low. For many species, such as the gastric botfly of rhinoceroses, intermediate hosts may be missing in captive situations. Except for the use of leptospiriosis bacterins in black and perhaps greater Asian one-horned rhinoceroses (a leptospiral-induced abortion has been reported in the latter species), vaccinations are not routinely practiced (it should be noted that, although infrequent, apparent adverse reactions to the leptospiral vaccination have included acute weakness and skin sloughing--all affected animals have survived). An ongoing program of vermin control is vital to maintaining sanitation and preventing the spread of disease.

Mammalian tuberculosis has been reported in several species of rhinoceroses and there is no reason to believe that they are not all susceptible. Testing has not been fully standardized, but several black rhinoceros that were infected with *Mycobacterium bovis* responded to the use of PPD bovis in the eyelid. Salmonellosis, including fatalities, has been reported in black rhinoceroses and again, it is prudent to consider all species susceptible.

There is some species-specific variation in the disease problems for rhino in captivity. The diseases of white rhinoceroses are fairly routine and mimic those that would be expected in populations of domestic large animals. However those of the black rhinoceros are much more common and unusual. In the black rhinoceros these include syndromes of hemolytic anemia, mucocutaneous ulcers, encephalomalacia, and fungal pneumonia. The causes of these syndromes are not all well-understood, however promising ongoing research may link apparently variant cellular metabolism in this species (much lower levels of intracellular glucose and the possible use of alterative energy pathways) with the etiologies of these syndromes. In the cases of acute hemolytic anemia in the black rhinoceros, at least 50% of the cases have been associated with *Leptospiriosis interrogans* infection. Given that information, vaccination with a 5-way bacterin including the serovars for *icterohemorrhagica* and *grippotyphosa* have been recommended. Indian rhinoceros have been notable for uterine leiomyomas, foot infections, and a possibly increased rate of stillbirths and

abortions. In at least one case, an abortion was associated with infection with *Leptospirosis interrogans*. Although their captive numbers are small, Sumatran rhinoceros have been diagnosed with gastrointestinal torsions, sepsis resulting from old snare wounds, uterine neoplasia and poor reproduction.

Anesthesia is relatively safe in all species and either standing or full anesthetic regimens have been employed. These generally are based on the use of reversible narcotics etorphine or carfentanil.

Nutrition of captive rhinoceroses is an ongoing challenge and an area that requires further research. We know that in the wild, black and Sumatran rhinoceros are browsers, white rhinoceroses are grazers, and that the greater Asian one-horned rhinoceros is generally classified as intermediate, but is mostly a grazer. The challenge arises in trying to present reasonable approximations of these natural diets to captive animals. Current recommendations are for grass hays for grazers and a mixture of grass and lucerne hay to the browsing species. Whenever possible, fresh browse plants should be fed to browsing species. Levels of vitamin E ( $\alpha$ -tocopherol) should be monitored as several studies have noted lower levels in captive rather than wild rhinoceroses.

## *RESEARCH*

In North America, under the direction of the Taxon Advisory Group's Research Advisory Group (RAG), a comprehensive, coordinated research program is being developed to address many of the problems in the captive management of these species. A list of scientific advisors is included in Table 3. Included in this effort will be a program to address health, reproduction, behavior, genetics and husbandry of these species.<sup>2,7</sup> Reproductive studies will include better methods of cycle determination, semen collection, and possibly artificial insemination and embryo transfer. If successful, the latter two procedures may in turn, prove useful in moving genetic material not only between zoological parks, but also from zoos to the wild, and even from park to park in the wild.

## **Summary**

The very survival of most rhinoceroses as a species and/or subspecies is challenged by poaching and habitat destruction. Continued and improved methods of protection in field are necessary to maintain these remnant populations. In addition, despite the challenges that each of these species/subspecies presents in establishing viable and self-sustaining populations in captivity, progress is being made. Recent animal moves and pairings, plus management changes will hopefully result in increased reproductive rates and more equal genetic representation for these populations.<sup>2,7</sup>

It seems reasonable to note that the survival of black rhinoceroses in eastern Africa has been in small, managed parks; preserves that contain isolated, protected populations. Thus, as wild populations become more threatened, the demographic, management and genetic principles of captive breeding programs become important to their survival as well.<sup>5</sup> As captive populations become larger through regional management programs, and many wild populations become more fragmented and isolated, the management techniques will grow more similar and offer increased opportunities for interaction between the wild and captive communities.

**LITERATURE CITED**

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**Table 1.** World populations of rhinoceroses.<sup>2</sup>

<u>Species</u>	<u>Wild</u>	<u>Global Captive</u>	<u>N.Am. Captive</u>
<b>African:</b>			
E. black	500	200-225	68
S. black	1400	47	29
S. white	7000+	500-700	125
N. white	30	9	4
<b>Asian:</b>			
Indian/Nepalese	2100	134	45
Sumatran	< 500	21	3

**Table 2.** Rhinoceros populations under intensive management ex situ or in situ on both global and regional levels current numbers 1995.\*

RHINO TAXON	WORLD			AFRICA			ASIA			AUSTRALASIA		
	DFNT	PSBL	TOT	DFNT	PSBL	TOTL	DFNT	PSBL	TOTL	DFNT	PSBL	TOTL
Eastern Black	155	21	176	0	7	7	25	10	35	3	0	3
Southern Black	46	1	47	4	1	5	0	0	0	9	0	9
Southwstrn Black	0	0	0	0	0	0	0	0	0	0	0	0
Northwest Black	0	0	0	0	0	0	0	0	0	0	0	0
Northern White	9	2	11	0	0	0	0	2	2	0	0	0
Southern White	480	184	664	23	34	57	106	45	151	13	0	13



<b>Indian/Nepalese</b>	<b>134</b>	<b>0</b>	<b>134</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>0</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Javan (Java)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Javan (Vietnam)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Mainland Sumatran</b>	<b>9</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Sumatra Sumatran</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Borneo Sumatran</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>African Rhino</b>	<b>690</b>	<b>208</b>	<b>898</b>	<b>27</b>	<b>42</b>	<b>69</b>	<b>131</b>	<b>57</b>	<b>188</b>	<b>25</b>	<b>0</b>	<b>25</b>
<b>Asian Rhino</b>	<b>155</b>	<b>0</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>73</b>	<b>0</b>	<b>73</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>All Rhino Taxa</b>	<b>845</b>	<b>208</b>	<b>1053</b>	<b>27</b>	<b>42</b>	<b>69</b>	<b>204</b>	<b>57</b>	<b>261</b>	<b>25</b>	<b>0</b>	<b>25</b>

**\* Numbers are current through 1 January 1996 for North America; 1 January 1995 for all other continents.**

Note: Numbers in this Table differ from totals provided in the International Studbooks. Numbers in this Table have been differentiated as Definite (DFNT) and Possible (PSBL). Definite are from places that have reported to the International or Regional Studbooks. Possible are animals registered as living in the International Studbooks but for which their institution has not communicated with the Studbook Keeper. Numbers have also been slightly modified based on personal knowledge of T.J. Foose.

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**Table 2 (continued).** Rhinoceros populations under intensive management ex situ or in situ on both global and regional levels current numbers 1995.\*

RHINO TAXON	EUROPE			N. AMERICA			C.&S. AMERICA		
	DFNT	PSBL	TOTL	DFNT	PSBL	TOTL	DFNT	PSBL	TOTL
Eastern Black	59	0	59	68	0	68	0	4	4
Southern Black	3	0	3	30	0	30	0	0	0
Southwstrn Black	0	0	0	0	0	0	0	0	0
Northwest Black	0	0	0	0	0	0	0	0	0
Northern White	5	0	5	4	0	4	0	0	0
Southern White	172	61	233	140	20	160	26	24	50
Indian/Nepalese	32	0	32	45	0	45	1	0	1
Javan (Java)	0	0	0	0	0	0	0	0	0
Javan (Vietnam)	0	0	0	0	0	0	0	0	0
Mainland Sumatran	0	0	0	0	0	0	0	0	0
Sumatra Sumatran	1	0	1	3	0	3	0	0	0
Borneo Sumatran	0	0	0	0	0	0	0	0	0
African Rhino	239	61	300	242	20	262	26	28	54
Asian Rhino	33	0	33	48	0	48	1	0	1
All Rhino Taxa	272	61	333	290	20	310	27	28	55

\* Numbers are current through 1 January 1996 for North America; 1 January 1995 for all other continents.

Note: Numbers in this Table differ from totals provided in the International Studbooks. Numbers in this Table have been differentiated as Definite (DFNT) and Possible (PSBL). Definite are from places that have reported to the International or Regional Studbooks. Possible are animals registered as living in the International Studbooks but for which their institution has not communicated with the Studbook Keeper. Numbers have also been slightly modified based on personal knowledge of T.J. Foose.

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**Table 3.** Coordinators and advisors to the North American regional management plans.

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Rhinoceros Taxon Advisory Group

Coordinator: Robert Reece, The Wilds  
Program Officer: Dr. Tom Foose, The Wilds and IRF  
Research Coordinator: Dr. Evan Blumer  
Veterinary Advisor: Dr. Eric Miller, St. Louis Zoo  
Nutritional Advisor: Dr. Ellen Dierenfeld, Wildlife Conservation Society  
Reproduction Advisor: To be named

Black Rhinoceros SSP

Coordinator (eastern subspecies): Edward Maruska, Cincinnati Zoo, Cincinnati, Ohio  
Coordinator (southern subspecies): Dr. Don Farst, Gladys Porter Zoo, Brownsville, Texas  
Veterinary Advisor: Dr. Eric Miller, St. Louis Zoo  
Pathology Advisor: Dr. Richard Montali, National Zoo  
Nutritional Advisor: Dr. Ellen Dierenfeld, Wildlife Conservation Society

White Rhinoceros SSP

Coordinator: Michael Fouraker, Fort Worth Zoo  
Veterinary Advisors: Dr. Michael Briggs, Chicago Zoological Park  
and Dr. Doug Page, Jacksonville Zoo  
Pathology Advisor: Dr. Robert Murname, Chicago Zoological Park

Greater Asian One-horned Rhinoceros

Coordinator: Mike Dee, Los Angeles Zoo  
Veterinary Advisor: Dr. Scott Citino, White Oak Conservation Center  
Pathology Advisor: Dr. Don Nichols, National Zoo

Sumatran Rhinoceros

Coordinators: James Doherty, Wildlife Conservation Society and  
James Dolan, Zoological Society of San Diego  
Veterinary Advisor: Dr. Mark Campbell, Cincinnati Zoo  
Pathology Advisor: Dr. Linda Lowenstein, Zoological Society of San Diego  
Nutrition Advisor: Dr. Ellen Dierenfeld, Wildlife Conservation Society

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**Table 4.** Rhinoceros populations under intensive management ex situ and in situ on both global and regional levels target numbers 1995.

	<b>WORLD</b>	<b>AFRICA</b>	<b>ASIA</b>	<b>AUSTRALASIA</b>	<b>EUROPE</b>	<b>N. AMERICA</b>	<b>C.&amp;S.</b>
<b>RHINO TAXON</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>	<b>Target 10/50/100 Years</b>
Eastern Black	200/240/240	10 ?	40/40/40	0	65*/100/100 +fndr?	90/90/90	?
Southern Black	80/160/400	50	0	20*/75/250 + 6 fndr	0	50/80/80	?
Sthwstrn Black	0	0	0	0	0	0	0
Nrthwst Black	0	0	0	0	0	0	0
Northern White	?	?	0	0	?	?	0
Southern White	515/525/500	0	150/?/?	45*/125/250 + 30 fndr	200/?/?	120*/120/120 + 10 fndrs	?
Indian/Nepalese	145/250/250	0	55/80/80	0	40*/80/80 +?fndrs	50/90/90	?
Javan (Java)	?	0	?	0	0	0	?
Javan (Vietnam)	?	0	?	0	0	0	?
Mainland Sumatran	12/40/100**	0	12/40/50	0	(50)**	0	?
Sumatran Sumatran	12/40/100**	0	12/40/50	0	0	10/20*/50 +10 fndr	0
Borneo Sumatran	8/25/100**	0	8/25/50	(50)**	0	0	0
<b>African Rhino</b>	<b>795/925/1140</b>	<b>60</b>	<b>140</b>	<b>65/200/500</b>	<b>220</b>	<b>290</b>	<b>?</b>
<b>Asian Rhino</b>	<b>177/355/550</b>	<b>0</b>	<b>230</b>	<b>(50)**</b>	<b>130</b>	<b>140</b>	<b>?</b>
<b>All Rhino Taxa</b>	<b>1000/1300/1700</b>	<b>60</b>	<b>277/300/400</b>	<b>65/200/500</b>	<b>305/300/300</b>	<b>320/400/430</b>	<b>?</b>

\* The "+ number" indicates that the indicated target includes the acquisition of this number of new founders which are thus included in the target total.

\*\* A desirable target if and when husbandry of this species can be mastered and sufficient founders for ex situ populations can be produced by captive propagation programs within range states.

*T.J. Foose - 1 February 1996*