

POPULATIONS AND CONSERVATION OF RHINOS

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Rhinos are a radiation of mammals with a glorious past, recently a rather gruesome present, and an uncertain future. The family Rhinocerotidae is one of the, perhaps the, most critically endangered family of mammals. While some of the decline of this magnificent group of creatures has been due to habitat destruction, the predominant cause has been overexploitation by poachers who are after the horn and to a lesser extent other parts of the rhino. The primary markets for rhino horn have been in China and other countries with large Chinese populations. Traditional Chinese folk medicine considers rhino horn the most effective anti-fever drug. A lesser market that has impacted mostly the African rhino species has been Yemen where the horns are used as ceremonial dagger handles, the most important symbol of status for Yemeni men.

Over the last several years, there have been both progress and problems with the status of the five extant rhinoceros species and their various subspecies. Table 1 provides a summary of the latest reported numbers by species and subspecies for both wild and captive populations.

Worldwide, there are now about 14,000 rhino in the wild in 1999. This total number has improved considerably since the early 1990s when total rhinos in the wild were down under 11,000. However, the status of the various rhino taxa varies considerably, some are recovering, others are still declining or at least remaining as precarious as ever.

Over 60% of the surviving rhino are of 1 subspecies, the southern white rhino (*Ceratotherium simum simum*). (Figure 1) This subspecies represents one of the two great success stories in recent rhino conservation. This subspecies has recovered from a low point of about 30 rhino at the start of the 20th century.

Ironically, the northern subspecies (*Ceratotherium simum cottoni*) of white rhino is one of the 3 most critically endangered taxa of rhino with no more than 25 surviving. This subspecies has fluctuated in numbers and had been as high as 32 in the early 1990s but has declined again due to 2 civil wars in the Democratic republic of Congo, its last range state.

The black rhino (*Diceros bicornis*) had declined so precipitously from 1970 when there may have been 70,000 to the early 1990s when numbers were down to 2,300. This precipitous decline has received more publicity than the plight of any other rhino species. However, over the last 3-4 years, the species, and 3 of its 4 subspecies, have been recovering with at least 2,600 at the end of 1997/start of 1998 and probably 100-200 more today. The species is distributed securely in 5 major range states. However, the 4th subspecies, the western, is also one of 3 most critically endangered taxa mentioned before.

Asian rhinos are more endangered than the African. The numbers of all 3 species of Asian rhino combined are probably fewer than the rarer of the African species, i.e. the black rhino. (Table 1 & Figure 3). Table 2 provides a summary by species and country of Asian rhino numbers.

Clearly, *Rhinoceros unicornis*, the Indian/Nepali rhino, is the other great success story in rhinoceros conservation. (Figure 4) In India, numbers have recovered from about 20 rhino at the start of this century to 1,800 today. In Nepal, numbers had declined to below 50 and now recovered to over 600. This success has been achieved by the most intense conservation supported almost entirely by the

governments of India and Nepal. This recover and the total numbers of this species are most encouraging.

However, long-term viability involves distribution as well as abundance and the fact that most of the Indian rhino are in just two populations. Limited distribution is a concern because of stochastic risks, e.g. the catastrophic floods that occur in Kaziranga or the social unrest that has decimated the once sizable population of Manas. For long-term viability, it is recommended that a rhino taxon achieve a total population of at least 2,500, preferably 5,000, individuals distributed across 10 or more populations, each of which is at least 100 in size and several of which are 500 or more in size.

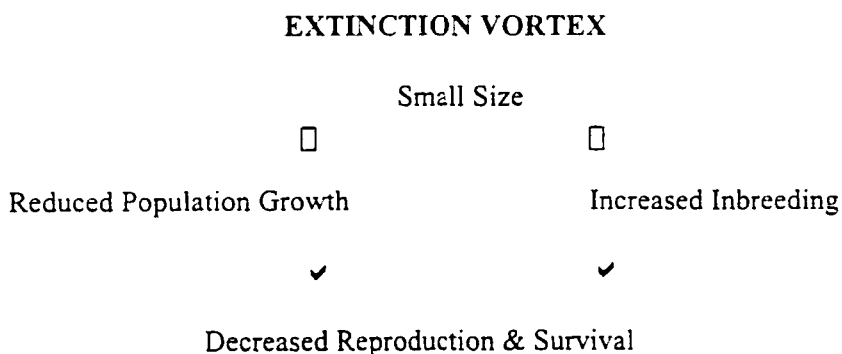
The rarest of the species of rhino is the Javan (*Rhinoceros sondaicus*) with fewer than 70 estimated to remain in just 2 populations: one in Java (~ 50 individuals) and the other in Vietnam (with only 5-8 survivors, the last of the 3 most critically endangered rhino taxa.) (Figure 5).

However, the most critically endangered of all rhino species is probably the Sumatran (*Dicerorhinus sumatrensis*). (Figure 6). Although its numbers (~300) are greater than are the Javan, the populations are more fragmented and less secure, because the species is still under intense pressure from poachers.

While precarious, the status of both the Southeast Asian rhino species (Sumatran and Javan) has improved over the last 3 years with the establishment of anti-poaching teams know as rhino protection units or RPUs. The AsRSG and IRF has helped range states organize the RPUs, with support from the Global Environment Facility (GEF), US Fish & Wildlife Service Rhino & Tiger Conservation Fund, WWF, the American Association of Zoo Keepers, the Anna Merz Foundation, and other partners.

In conclusion, the situation for some rhinos is better but others are still on the brink of extinction. All rhino taxa remain conservation dependent and there is no cause for relaxation or complacency in efforts to conserve these spectacular creatures.

Clearly rhinos are examples of species with low numbers and fragmented distribution. Both conditions imperil long-term viability. Indeed, small populations are vulnerable to what are known as an extinction vortex:



Therefore, conservation strategies for species such as rhino need to be based on maintenance or recovery of viable populations. i.e. populations sufficiently large and well distributed to avoid demographic, genetic, and stochastic (i.e. catastrophes) risks. Development of viable population strategies usually entails a role for captive populations.

In general, there are four main roles and goals for captive programs as part of conservation strategies for threatened species like the rhino:

- (1) **Propagation** to provide a genetic and demographic reservoir that could be used to reinvigorate or re-establish wild populations if and when the need and opportunity occur.

In other words, a captive population provides an insurance policy against catastrophes in the wild. It is usually easier to ensure protection of rhino when they are in captive situations. Ideally captive populations can be part of the metapopulation that will include integrated and interactive management of numerous disjunct wild populations (Figure 1).

- (2) **Education** to provide the public with information and an appreciation of these magnificent species, their plight in the wild, and the need for active conservation programs.
- (3) **Research** to provide information that can be useful to management of the species both in captivity and the wild.
- (4) **In Situ Support** to provide funds for conservation in the wild from contributions recruited through captive institutions and programs.

Currently captive institutions are the source of over \$1,000,000/year for *in situ* conservation although virtually all of these funds to date have been directed to the African and Southeast Asian rhino species. However, at this meeting I am happy to announce that through a contribution from Mrs. Anna Merz, the International Rhino Foundation (IRF) will provide at least \$ 5,000 to Assam for intelligence work and another \$ 5,000, for census work.

In terms of the propagation roles, captive populations can and should be part of metapopulation strategies, i.e. integrated and interactive management of geographically disjunct wild and captive populations by movement of rhino among them.

In order to preserve the genetic diversity and maintain the demographic security necessary for captive populations and programs to perform these conservation roles, it is critical to manage rhino in captivity scientifically. Such scientific management is the goal of the Species Survival Plans (SSPs) that originated in North American Zoos that are members of the AZA and have extended worldwide. The rhino serves as the symbol for all SSP programs worldwide.

There are three main components to the scientific management: genetics, demography, and husbandry. Together, these three form the captive management triangle. The AZA Husbandry Manual and the AZA SSP Masterplans for Rhinoceros elaborate on the details of this management.

Globally, there are about 1,100 rhino in captivity. (Table 1) However, analogous to the situation with rhinos in the wild, over half of these rhinos are southern white rhinoceros. Table 2 presents a more detailed summary of the status of captive rhino populations.

The captive population(s) of **southern black rhino** is increasing at a healthy rate, analogous to many wild populations. For the southern black, a major reason for its success is that it has been relatively recently established, in the 1980's, and has been managed very scientifically through the organized regional breeding programs like the Species Survival Plan (SSP) in North America and the European SSP in Europe.

The captive population(s) of **eastern black rhino** is not increasing because it is an older population, both in terms of when it was established, i.e. before modern management practices evolved, and of the ages of rhinos themselves. Captive managers are currently in the process of reconstructing a healthy age and sex distribution for the population and it is expected that this population may be able to emulate the southern black rhino in the future.

The captive population(s) of **southern white rhino** was not managed to optimize reproduction from the 1960's through the 1980's. Many animals were kept as pairs which is not conducive to reproduction in this more gregarious species. Indeed, many of the pairs were together from an early age and developed sibling relationships which further inhibited reproduction. As a consequence, much of the captive population has senesced. A subset of the captive institutions with this taxon have propagated very well. Captive managers are currently in the process of reorganizing and rejuvenating this captive population and hopes are high for viability in the future.

The captive population(s) **Indian/Nepali rhino** is also increasing at a healthy rate, again analogous to many wild populations. Population growth rates would be even higher for Indian Nepali rhino except that 25% of the captive population is in Indian zoos where a skew of sex ratio toward males and some other management problems. has limited reproduction.

The captive population of **northern white rhino** is also one that was not managed intensively until much of it had senesced. There is still hope that reproduction will resume at Dvur Kralove.

The captive population(s) of **Sumatran rhino** has prospered, but captive managers are adaptively modifying this program by moving animals from traditional zoos to breeding centers in native habitat. Research has also revealed that the species is a complex induced ovulator which has complicated attempts to reproduce the species. With this knowledge, captive managers think they know better how to manage the rhinos to induce breeding. There is evidence that these adjustments are succeeding with matings occurring at several facilities involving at least 6 females and 3 males.

While captive populations and programs are critical for rhino conservation, it is obvious that many problems remain to be solved. Much research is in progress to improve the management and the viability of rhino in captivity.

TABLE 1
WILD AND CAPTIVE POPULATIONS OF RHINOCEROS
 1999

SPECIES OR SUBSPECIES	WILD POPULATION	CAPTIVE POPULATION
Southwestern Black Rhino	740	0
Northwestern Black Rhino	~10	0
Eastern Black Rhino	485	180
Southern Black Rhino	1,365	60
TOTAL BLACK RHINO	2,600	240
Northern White Rhino	25	9
Southern White Rhino	8,440	~700
TOTAL WHITE RHINO	8,465	~710
<i>AFRICAN RHINO SPECIES</i>	<i>11,065</i>	<i>~950</i>
TOTAL INDIAN/NEPALESE RHINO	2,470	136
Indonesian Javan Rhino	50-60	0
Vietnamese Javan Rhino	5-8	0
TOTAL JAVAN RHINO	~60	0
Eastern (Borneo) Sumatran Rhino	~50	3
Western (Sumatra/Malaya) Sumatran Rhino	~250	14
TOTAL SUMATRAN RHINO	~300	17
<i>ASIAN RHINO SPECIES</i>	<i>~2,830</i>	<i>~150</i>
ALL RHINO SPECIES	~14,000	1,100

Source: IUCN/SSC African & Asian Rhino Specialist Groups & The International Studbooks for Rhinos - May 1999

TABLE 2
OVERVIEW OF CAPTIVE RHINO POPULATION - 1999

TAXON	TOTAL POPULATION		SURVIVING BIRTHS SINCE 1/1/97		APPROXIMATE ANNUAL POPULATION CHANGE	
	WORLD	N. AMERICAN SSP	WORLD	N. AMERICAN SSP	WORLD	N. AMERICAN SSP
Eastern Black Rhino <i>Diceros bicornis michaeli</i>	80\101 = 181	39\30 = 69	4\15 = 19	3\3 = 6	~ +1%	~ 0% to +1%
Southern Black Rhino <i>Diceros bicornis minor</i>	29\29 = 58	18\18 = 36	6\3 = 9	6\2 = 8	~ +10%	~ +10%
Southern White Rhino <i>Ceratotherium simum simum</i>	334\368 = 702	58\79 = 137	15\16 = 31	6\4 = 10	~ 0% to -1%	~ 0% to -1%
Northern White Rhino <i>Ceratotherium simum cottoni</i>	4\5 = 9	1\2 = 3	0\0 = 0	0\0 = 0	0%	0%
Indian/Nepali Rhino <i>Rhinoceros unicornis</i>	73\63 = 136	23\23 = 46	5\2 = 7	2\1 = 3	~ +3%	~ +4%
Sumatran Rhino <i>Dicerorhinus sumatrensis</i>	5\12 = 17	1\2 = 3	0\0 = 0	0\0 = 0	0%	0%

Rhinoceros

Source of Data: *International Studbook for African Rhinoceros;*
International Studbook for Greater One-Horned

International Studbook for Sumatran Rhinoceros
North American Regional Studbooks for Rhinoceros

Table prepared by Dr. Tom Foose, International Rhino Foundation (IRF)