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RHINOCEROS TAXON ADVISORY GROUP

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Primary Goals

Considering the continuing crisis in rhino conservation, the primary goals of the AZA Rhinoceros Advisory Group (RAG) are:

1. Development of viable *ex situ* populations as:
 - a. Reservoirs of genetic and demographic material as potential reinforcement of populations in the wild;
 - b. Subjects for research to improve conservation management *in situ* as well as *ex situ*;
 - c. Ambassadors to stimulate public awareness and support, especially financial, for rhino conservation.
2. Toward achievement of Goal 1, improvement of captive husbandry and management through research in health, nutrition, behavior and reproduction.
3. Facilitation of and coordination among the SSP programs for all rhino species (in collaboration with the species coordinators and the management groups).
4. Assistance (financial, technical, and administrative) with selected *in situ* efforts for rhino with emphasis on those projects that are significant, feasible, and provide appropriate opportunities for application of the particular expertise that the captive conservation community can provide in terms of intensive management technology.
5. Partnership with the International Rhino Foundation (IRF) particularly in pursuit of Goal 4.

Special Concerns

The conservation crisis for rhinoceros continues. There has been improvement on a number of fronts but continuing challenges on others. In Africa, most of the news is good. The southern white rhino have continued to increase and now are estimated at 8,400. Numbers of black rhino have continued their recovery and numbers are now estimated at 2,600, a 13% increase over their low point of 2,300 earlier in the decade. Nevertheless, the poaching threat is still serious. The bad news is the situation for northern white rhino remains precarious with 25 or fewer rhino surviving. The second civil war in three years has bedeviled conservation efforts in Garamba but there seems to some improvement on the horizon. The IRF with support from the RAG has become the lead NGO operating in Garamba. In Asia, the Sumatran rhino with fewer than 400 individuals remains under intense poaching pressure although the rhino protection units (RPU), formed with IRF and IUCN/SSC Asian Rhino Specialist Group (AsRSG), facilitation seem to be ameliorating the situation. The American Association of Zoo Keepers (AAZK) is providing funds to help support the RPUs. The managed breeding programs for Sumatran rhino at facilities in native habitat in Indonesia (Way Kambas National Park), Peninsula Malaysia (Sungai Dusun) and Sabah (Sepilok) continue. RPUs for Javan Rhino in Indonesia have also been established and are operating well. Poaching pressure on and habitat problems for the third species of Asian rhino, the India/Nepali (up to 2,500 in the wild), remains high and the possibility of a major decline remains real. The RAG, again in conjunction with the IRF and the IUCN/SSC Asian Rhino Specialist Group (AsRSG) are attempting to develop a major cooperative program with conservation authorities for this species in both India and Nepal.

The AZA Rhinoceros Advisory Group also remains concerned with the successful implementation and management of sustainable *ex situ* populations, especially considering the critical state of wild populations. All of the rhino SSP programs have deficiencies that are receiving attention. Major problems relate to husbandry, health, and reproduction of the animals as well as financial and physical resources. A demographic imperative also exists for both subspecies of white rhino in AZA institutions. To ameliorate the problem for the southern subspecies, the RAG and IRF have developed a cooperative program with South African National Parks which is providing surplus rhino as new founders to rejuvenate the SSP population and is receiving significant funds and at least one black rhino for *in situ* conservation efforts. The Sumatran rhino continues as the greatest challenge in rhino conservation both *ex situ* and *in situ*. All 3 (1.2) surviving individuals in the SSP population (from a maximum of 7) have been consolidated at the Cincinnati Zoo. The Cincinnati Zoo is continuing its program of reproductive research and management, which has produced some progress. The younger of the two females there has been pregnant four times in the last year, once for about three months; three pregnancies have failed for reasons yet unknown; but the fourth pregnancy continues at this time. Concurrently, efforts continue to develop managed breeding centers in native habitat in both Indonesia and Malaysia has progressed.

Progress Toward Goals

1. The 1998 AZA SSP Master Plan for Rhinoceros continues to be implemented. An update of the Master plan is intended for late 1999 or early 2000.
2. Further implementation of the AZA Regional Collection Plan for Rhino has occurred as several new institutions have added rhinos and others have converted species.
3. The eight major research projects which the RAG and IRF have been supporting have generated useful results. These projects comprise: one on health of black rhino: one on nutrition of all rhino: three on reproductive research on Sumatran rhino; two on reproductive research on African rhino but with extension to all rhino; one on improved health/husbandry data bases and tissue sample collections. These projects are continuing.
4. A new version of the Five-Year Research Master plan, first formulated in 1993, has been produced. Based upon the results of these research projects and the recommendations of the RAG Research Council, the International Rhino Foundation (IRF), in partnership with another organization, SOS-Rhino, will issue a new Request for Proposals (RFP) in 1999.
5. The RAG has provided letters of support for other research projects applying for funding from sources other than IRF.
6. In an effort to correct for the skew toward males in sex ratio of calves in the black rhino, the RAG facilitated an exchange of rhinos between the AZA SSP and the SSCJ in Japan: the SSP received a female and the SSCJ obtained two males. Dr. Evan Blumer of the Wilds and the RAG accompanied all rhino in transit.
7. The RAG, in collaboration with IRF, also facilitated the importation of 4.12 southern white rhino from the wild at Kruger National Park to rejuvenate this SSP population; 2.4 more will arrive in October 1999. In exchange, South African National Parks are receiving about \$375,000 for *in situ* conservation efforts.
8. There has been significant progress on several components of the Five-Year Plan's *in situ* programs, through partnership with the International Rhino Foundation (IRF), i.e.:
 - a. Operation of *in situ* managed breeding programs for Sumatran rhino in Indonesia and Malaysia is proceeding well with a number of animals mating and some possibly pregnant.
 - b. Rhino protection units (RPUs) for Sumatran rhino and Javan rhino in Indonesia and Malaysia continue their effective work.
 - c. Continued and increased support and leadership for conservation of northern white rhino in Garamba.
9. The RAG/IRF Program Office has continued to work closely with the Office of International Affairs, U.S. Fish & Wildlife Service, on various projects involving implementation of the Rhinoceros and Tiger Conservation Fund (RTFC) including:
 - a. Review of proposals submitted to USFWS for support under RTCF;
 - b. Receipt of grants for several projects, administered by the IRF (RPUs and SRS)
 - c. Attempts to persuade Congress to appropriate more funds for RTCF.
10. The website, established in conjunction with the IRF (at new address <http://www.rhinos-irf.org>) has continued to evolve and now has a listserve operational to facilitate communication among various rhino constituencies including the RAG.
11. The RAG Program Office has continued to provide technical services for the AZA Rhino Master plans, to maintain the AZA Rhino Regional Studbooks as well as the International Studbook for Sumatran Rhino, and to collaborate with the International Studbooks for African and Indian Rhinoceros and the other regional breeding programs for rhino.

Short-Term Goals for Coming Year

1. Continue with implementation of and produce an update for the AZA SSP Master Plan for Rhino.
2. Continue financial support and strategic guidance for management-oriented research on rhinos, especially in conjunction with the IRF and now also SOS-Rhino.
3. Continue and increase support, through IRF of programs for *in situ* conservation of rhinos;
4. Facilitate additional exchanges of rhino between SSP and other Regional Rhino Breeding Programs as well as managed populations in the wild.
5. Implement AZA mandated changes in structure and function of taxon advisory groups.

Data Table (current through 1 July 1999)

	Two Years Ago	One Year Ago	Current Year
# of meetings	0	2	2
# of studbooks under umbrella	4	4	4
# of SSPs under umbrella	4	4	4
# of new studbook petitions submitted	0	0	0
# of new studbooks approved	0	0	0
# of new SSP petitions submitted	0	0	0
# of new SSPs approved	0	0	0

Financial Report

Starting balance (1 July 1998)	\$33.26
Funds raised*	\$3,635.25
Funds expended*	\$2,555.92
Ending balance (1 July 1999)	\$1,079.33

*Much of the RAG's activities relative to *in situ* programs and research projects is in partnership with the IRF which from Sept. 1998 to Sept. 1999 is providing and/or administering approximately \$1,000,000 for rhino conservation.

BLACK RHINOCEROS SPECIES SURVIVAL PLAN

(*Diceros bicornis*)

Species Coordinator: Dr. Don Farst, Director, Gladys Porter Zoo

Regional Studbook Keeper: Thomas J. Foose, Ph.D., The Wilds & International Rhino Foundation

Introduction

The AZA Black Rhino SSP continues its attempts to develop self-sustaining populations of two subspecies or geographical varieties of the species as a genetic and demographic backup to wild populations and as a resource to conduct management-oriented research and generate funds for *in situ* conservation. The 10 year/50 year/ and 100 year target population objectives are: *michaeli* 90/90/90 and *minor* 50/80/80. The goal is to preserve in the captive population 90% of the gene diversity from the wild population for 100 to 150 years (i.e. 7-10 rhino generations).

Data Tables *D. b. michaeli* (current through 1 July 1999)

	Two Years Ago	One Year Ago	Current Year
# participating institutions	31	31	30
Total world captive population	87.98 = 185	Not available	76.99 = 175
Total N. American captive population	42.31 = 73	42.31 = 73	37.29 = 66
# of SSP animals managed	41.31 = 73	42.31 = 73	66
# of SSP recommended births	3	3	4
# of nonrecommended births	0	0	0
# of deaths of SSP animals	3	3	9
# of imports	4	0	1
# of exports	0	0	2
# founders with descendants	39	38	38

Data Tables *D. b. minor* (current through 1 July 1999)

	Two Years Ago	One Year Ago	Current Year
# participating institutions	10	9	9
Total world captive population	29.32 = 61	Not available	27.31 = 58
Total N. American captive population	18.20 = 38	18.17 = 35	17.19 = 36
# of SSP animals managed	38	35	36
# of SSP recommended births	7	0	3
# of nonrecommended births	0	0	0
# of deaths of SSP animals	0	3	1
# of imports	0	0	0
# of exports	0	0	1
# founders with descendants	27	23	23

Current Population Status

The SSP population of *minor* is now growing at a healthy rate. The population should attain its desired target size of 80 in another rhino generation (~15 years). The *michaeli* population is larger and nearer to its target population size but has been more or less stagnant in size for a number of years. According to the International Studbook for African Rhinoceros, the global captive population of *michaeli* is 175 and of *minor* 58 for a total of 243. Wild populations of black rhino are gradually recovering in most range states although the threat of significant poaching remains throughout Africa. Current numbers in the wild are estimated at 2,600+, i.e. 300 above the low point of 2,300 earlier in this decade.

Demographic Trends

Reproduction is adequate but not optimal in *D. b. michaeli*; reproduction is vigorous in *D. b. minor*. A major demographic problem continues to be high mortality due to a complex of health problems (including hemolytic and hemorrhagic anemia, liver toxicities, encephalomalacia, various infectious, and a recently described idiopathic hemorrhagic vasculopathy syndrome). However, with various preventative and therapeutic measures suggested by the continuing research on these problems, mortality had seemed to decline over the last several years, although the last year has been bad again for *michaeli*. There has also been a demographic problem in *michaeli* of a serious (statistically significant) skew toward males in sex ratio of calves born in the SSP: 22 males in the 29 surviving births from 1990 through 1999. A similar trend, although not yet statistically, has been observed in *minor*, although two of the three surviving calves born over the last year have been females. In an endeavor to redress this demographic imbalance in *michaeli*, a captive-born female was imported from Japan during the last year in exchange for two captive-born males from the SSP to Japanese zoos. This exchange extends the excellent cooperation between the SSP and SSCJ (Species Survival Committee Japan). Unfortunately, one of the three female *michaeli* imported from Addo in 1996/97 has died without any descendants in the SSP.

Population Genetics

The genetic foundation of the *michaeli* population seems adequate at this time: there are 38 founders; gene diversity is about .97. The addition of new founder lines with animals imported for demographic reasons will further secure this situation. The genetic status of *minor* in the N.A. population is also sound: there are 23 founders with another one a potential; gene diversity is about 0.96. There is an ongoing effort in *minor* to increase founder representation through recruitment of reproduction from nonbreeder founders already in the population. There is the possibility of increasing gene diversity by recovering representation from a founder that was translocated to Australasian after which all his descendants in North America died.

Special Concerns

Health and husbandry need to be improved to increase survival and reproduction in this species. The continuing mortality in *michaeli* is of paramount concern. Toward this end during the last year, a most promising hypothesis has emerged. Dr. Don Paglia has hypothesized that many of the disorders of black rhino may derive from an excess of iron (iron overload) in the rhino. In the wild, the browse consumed by black rhino contains many tannins and other secondary compounds, which plants have evolved as chemical defenses against herbivores. One adverse effect of these compounds is to bind dietary iron in a form unusable by the rhino. As a consequence, black rhino may have evolved mechanisms to use iron very efficiently since it is not readily available from their natural diets because of the tannins. In captivity, with iron usually more abundant in the supplemented diets compared to natural vegetation and without tannins to reduce the usability of ingested iron, the rhino may accumulate an excess of this mineral, which can then cause problems. Iron overload is a known disorder in other species. The possible causes of the skew towards males in sex ratio of calves also needs to be intensively investigated to determine if there are possible management factors causing this pattern. Additional space for both subspecies needs to be increased and coordinated with each other and with the two other major rhino taxa in SSP programs, i.e. the white and Indian rhino. The Black Rhino SSP has been working in particular with the White Rhino SSP in hopes of moving white rhino from selected institutions to open up more space for black rhino. Better coordination is the reason for combining the black and white rhino first in the African Rhino SSP Master Plan of 1994 and now in the totally consolidated AZA Rhino Master Plans of 1996 and 1998. The question of whether or not to keep *michaeli* and *minor* as two subspecies is still pending but the SSP will continue maintenance of separate populations until a demographic imperative indicates otherwise and/or the IUCN/SSC African Rhino Specialist Group decides to abolish the distinction.

Research

There are several major research projects in progress involving health, husbandry, nutrition, and reproduction of black rhino, under auspices of the AZA Rhinoceros Advisory Group and with funding from the International Rhino Foundation (IRF) and other sources. A new Request for Proposals (RFP), similar to what was conducted in 1996 by the IRF, will be issued by the end of July 1999. Projects selected for funding from this RFP are expected to be supported jointly through a partnership of IRF with another organization: SOS-Rhino.

Progress Toward Goals

1. The SSP Master Plan was updated in January 1998 as a result of a workshop for all Rhino SSPs conducted at White Oak Conservation Center in November 1997. Another update is expected in late 1999 or early 2000.
2. An appreciable number of rhino continue to be relocated in an endeavor to induce more reproduction. There are already positive results from these moves and more relocations are planned.
3. To continue redress of the demographic imbalance caused by the skew towards males in sex ratio of *michaeli* calves born in the SSP, a females has been acquired from the Japanese SSC.
4. Major research projects on health, nutrition, and reproduction are in progress with support from the International Rhino Foundation.
5. Captive habitat for black rhino in North America has been and continues to be expanded through coordination with the White Rhino SSP.

Field Conservation

The SSP is working with the International Rhino Foundation (IRF) to provide support for selected *in situ* projects throughout Africa.

Short-Term Goals for the Coming Year

1. The 1998 SSP Rhinoceros Master Plan recommendations for black rhino comprising will be updated.
2. Attempts will continue to reproduce all breeding age females and recommendations will continue to wean calves as soon as possible to be able to expose post-lactational cows to bulls.
3. Research will be conducted to test the iron overload hypothesis.
4. Research effort will also continue to determine if there are management factors causing the skew towards males in the sex ratio of black rhino calves born in the SSP.
5. The SSP will continue to interact with other regional *ex situ* breeding programs as well as with *in situ* protection and management efforts.

Financial Report

The Black Rhino SSP does not maintain a separate bank account but works through the accounts maintained by AZA Rhinoceros Advisory Group and the International Rhino Foundation.

WHITE RHINOCEROS SPECIES SURVIVAL PLAN
(*Ceratotherium simum*)

Species Coordinator: Michael Fouraker, Fort Worth Zoo
Regional Studbook Keeper: Tom Foose, Ph.D., The Wilds

Introduction

With the importation of 4.15 (19) animals and 5.3 (8) births, the AZA White Rhino SSP is making great strides to address the demographic crisis that has been facing the species. Immediate concerns for the White Rhino SSP continue to be the demographic status of the population and the need for adequate captive space and herd management.

Data table Southern white rhino (*Ceratotherium simum simum*) (current through 15 July 1999)

	Two Years Ago	One Year Ago	Current Year
# participating institutions	39	39	41
Total captive population	55.65 (120)	54.64 (118)	60.81 (141)
# SSP animals managed	120	118	141
# SSP recommended births/hatches	3.2	1.0	5.3
# SSP non-recommended births/hatches	0	0	0
# deaths of SSP animals	3.5	2.1	2.0
# imports	0	0	4.15
# exports	4	0	0
# founders with descendants	39	39	39

Demographic trends

As has been reported in the past several years, the southern white rhino population has faced a demographic crisis. Less than 10% of the captive population is captive born and bred, numerous genetically valuable individuals have not reproduced, and the age structure is senescing (at least 55% of the population is older than 25 years of age). However, this past year, 8 births occurred and 19 animals were imported. These births and importations will significantly increase the genetic viability of the population. A particular concern of the SSP will be the recruitment of these new founder animals into the breeding population. As part of this importation program, organized by the International Rhino Foundation (IRF) and supported by several SSP-participant institutions, an additional 12 rhinos will be translocated from North America to Australasia. These animals will be the new founders in the Australasian captive white rhino population.

The SSP has acquired a new nonmember SSP-participating institution: Lion Country Safari, Florida. The recruitment of institutions such as Lion Country Safari, which can hold large herds of rhino, will be particularly important to the integrity of the population. Another AZA institution, Busch Gardens (FL), joined the SSP.

One of the male northern white rhinos previously held at the San Diego Wild Animal Park was returned to Dvur Kralove to facilitate breeding at that institution. To date, there has been copulation with the two younger females at that facility as a result of the transfer; however, no confirmed pregnancies. Currently, the northern white population in the U.S. consists of only 1.2 (3) animals (SD-WAP), none of which have reproduced. Furthermore, all are more than 20 years of age and thus may be post-reproductive.

Population Genetics

The genetic objective of the White Rhino SSP is to maintain 90% gene diversity for 110-150 years. This goal may be achievable if the current attempts at improved reproduction succeed. Additionally, the SSP will pursue the importation of another 2.4 animals this year.

The situation for the northern white rhino continues to look bleak. Without reproduction and with such a low number of founders, this population is not likely to be genetically viable without the global management of both captive and remnant wild animals.

Special Concerns

1. **Demographic crisis:** The major problem facing the White Rhino SSP that continues to require attention is the demographic status of the population. Reproduction to date has been sporadic across institutions, and only a few institutions have produced calves consistently. As noted previously, unproven breeders must be recruited into the breeding population in order to meet the population's genetic goals. The number of requests from institutions for animals exceeds the number of individuals available within the SSP population. The addition of the new founders and the births in the population this year are very promising and will assist the SSP in addressing this concern.
2. **Continued need for large enclosures and social groups:** Large captive spaces must be identified that can hold white rhinos in herd situations to encourage reproduction. There are a total of 86 adult spaces and 35 calf spaces in 13 facilities (current and proposed).

Research

1. **Understanding basic reproductive biology to conserve the African rhinoceros (T. Roth (Principal Investigator), Center for the Reproduction of Endangered Wildlife (CREW))** To date, nine White Rhino SSP institutions are participating in an International Rhino Foundation (IRF)-funded project examining the basic reproductive biology of the African rhino. This project was initiated in 1997, and recently received additional funds to cover expenses and expand research directions. The project encompasses four studies with the following specific objectives:
 - A. To establish the reproductive status of the extant population by measuring reproductive cycle patterns via hormonal profiles and relating these data to reproductive behavior, seasonality and stress;
 - B. To determine the feasibility of noninvasively estimating time of ovulation;
 - C. To examine the impact of seasonality on male reproductive hormones;
 - D. To begin developing and testing the feasibility of transcervical artificial insemination;
 - E. To set the stage for the development of a rhino genome resource bank. Data collection included the collection of feces (to monitor hormonal patterns) and behavioral data (to identify behaviors that may correlate to estrus; coordinated by T. Wagener, Fort Worth). Results of this study are in press.
2. The International Rhino Foundation and Zoological Society of San Diego hosted a workshop on problems associated with the low rate of reproduction among captive-born female southern white rhinos. Few captive-born females of reproductive age have ever reproduced. The majority of these rhinos monitored by hormones have been found to be either acyclic or to demonstrate irregular cycles. Topics included extended luteal phases, ovulation induction and behavior. The White Rhino SSP supported and participated in this important project. The proceedings of the workshop are available from the San Diego Wild Animal Park.

Field Conservation

1. **South Africa White Rhino Conservation:** As part of the IRF and White Rhino SSP importation program, the captive community has contributed almost \$600,000 to *in situ* rhino conservation in South Africa.
2. **Garamba National Park:** With the support of many AZA White Rhino institutions and the newly formed International Elephant Foundation, the International Rhino Foundation has now assumed the lead NGO role for northern white rhino in Garamba. These efforts provide salaries and operating supplies for the anti-poaching patrol officers working in Garamba. This rhino population is under increased threats due to the continued political unrest in the country.

Progress Toward Goals

1. Compliance with SSP master plan recommendations is good. Over twenty rhinos have been transferred in the past two years.
2. A bachelor group of young males has been established to help address the "sibling relationship" syndrome that seems to occur when young white rhino, especially pairs, are placed together from an early age.
3. The SSP supported and participated in the workshop on reproductive problems in southern white rhino generously funded by the International Rhino Foundation and the San Diego Wild Animal Park.
4. Significant research projects have been funded which will set the stage for hopefully increasing the population growth rate and recruiting additional founders into the population.

Short-Term Goals for the Coming Year

1. Import 2.4 southern white rhino from South Africa.
2. Pursue and support additional reproductive research and individual animal evaluations.
3. Complete the biannual master plan analyses and recommendations.
4. Improve conditions to stimulate reproduction in those institutions holding the individuals that are not breeding.
5. Do not move females older than 21 years of age in an attempt to induce breeding. Rather, there should be attempts at inducing reproduction by hormonal treatment.
6. Designate most females older than 25 years of age (with a very few exceptions) as a surplus/research population. It is recognized that many of these animals may be lost as potential breeders, but remain important to social herd structure.
7. Continue the intensive reproductive assessment and management, including the hormonal manipulation of the three northern white rhinos.
8. Increase cooperation with Dvur Kralove to maximize the possibility of successful reproduction with the northern white subspecies.
9. Continue to facilitate and encourage the compliance with all master plan recommendations.
10. Support and conduct research leading to increasing the population growth rate and recruiting additional founders.

Financial Report

There is not a dedicated fund for the White Rhino SSP. White Rhino SSP research and conservation projects are supported both logistically and financially by the Rhino TAG and IRF.