

## BLACK RHINOCEROS SPECIES SURVIVAL PLAN

(*Diceros bicornis*)

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### 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<br>Ago | One Year<br>Ago | Current<br>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<br>Ago | One Year<br>Ago | Current<br>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.