

Proceedings of African Rhino Workshop

INTRODUCTION

Rhinos in Africa are in a crisis situation. Numbers of black rhinos in Africa have been reduced, largely by poaching, from an estimated 60 000 in 1970 to less than 4 000 today. Moreover, many of the remaining animals are distributed in small and fragmented populations whose survival may be endangered by genetic and demographic problems even if they can be protected from poachers. About 150 black rhinos are maintained in the zoos of the world. Almost all of these animals are derived from the East African populations.

The northern subspecies of the white rhino has declined to even lower numbers, with a maximum of only 20 animals known to survive in the wild in Africa. About a dozen animals are maintained in captivity, 9 of them (including all of the females) at a single institution, the zoo at Dvur Kralove, Czechoslovakia.

In response to this crisis, an African Rhino Workshop convened at the Cincinnati Zoo, 25-28 October 1986. The Workshop was organized by Cincinnati Zoo, the King's Island Wild Animal Habitat, and the AAZPA Conservation Coordinator's Office in consultation with the IUCN/SSC African Elephant and Rhino Specialist Group (AERSG) and Captive Breeding Specialist Group (CBSG). The Workshop was supported by a number of zoological organisations and institutions in North America including the AAZPA Conservation Endowment Fund.

Approximately 100 persons participated in the Workshop, representing field conservationists, zoo professionals, academic researchers, and support organizers from Africa, North America and Europe. The chairmen and many members of the AERSG and CBSG were in attendance. Lists of participants and sponsors are appended.

The Workshop was organized to pursue several objectives:

- (i) to contribute to development of the global strategy to conserve African rhinos;
- (ii) to integrate and coordinate field and captive programs to preserve African rhinos, and especially to delineate how zoos can assist more with attempts to preserve these species;
- (iii) to apply the principles of conservation biology, especially genetic-demographic management and decision analysis, to conservation of African rhinos.

The Workshop participants discussed problems and potentials for these objectives for three days. As a result, a number of recommendations and resolutions were adopted.

RECOMMENDATIONS

GENERAL

1. The Workshop emphasizes that continued poaching for the illegal trade in rhino horn is the greatest threat to the ultimate objective of survival of African rhinos in the wild, both as species and as components of their ecosystems. Therefore, the Workshop strongly encourages continued and intensified anti-poaching measures. Further, the Workshop urges continued and intensified efforts to reduce and eventually eliminate the trade in rhino horn, in particular, the Workshop urges the Organization of African Unity (OAU) and its member nations to apply pressure on those African countries harboring culprits to implement all measures necessary to eliminate poaching and illegal trade in rhino horn and other

products.

2. To facilitate the *ex situ* programs for African rhinos, the Workshop observes the great need for annual updates of the international Studbook for both black and white rhinos. Moreover, the Workshop suggests that there be consideration of using studbook techniques for intensive *in situ* management of rhinos in Africa. The zoo community is able and willing to help African nations technically and financially with this endeavour.

3. The Workshop believes there is a need to improve the clinical and pathological investigations of both black and white rhinos in captivity and where practical in the wild. In this regard, the Workshop recommends that there be consideration of formulating and implementing standard methods of recording information collected in these investigations. It is also desirable to preserve and inventory biological samples, including osteological material.

4. The Workshop recommends that research be conducted on enhancement of reproduction in rhinos to provide techniques for transfer of germ plasma or genetic material which can be used for genetic and demographic management of captive and wild populations to assist in their survival. These techniques could reduce the costs and risks of moving live animals for management purposes and could permit more rapid expansion of under-represented genetic bloodlines of rhinos.

This research would include oestrus detection and synchronization; the collection, analysis and cryopreservation of germ plasma; artificial insemination; and embryo transfer technology.

A researcher, working with an established reproductive research group, is needed to coordinate efforts currently underway and to conduct further specific projects. Such an effort will need to be funded for 3-5 years with direct costs of about \$65 000 per year. The responsibility for organizing this effort has been accepted by the AAZPA SSP Species Coordinators for Black and White Rhinos.

5. The Workshop recognizes the usefulness of *Pachyderm*, the Newsletter of the AERSG, as a primary reference on rhino conservation, issues and priorities. Therefore, the Workshop urges wider distribution of *Pachyderm*, especially to *ex situ* facilities and fund-raising organizations. Further, the Workshop endorses the idea of including in *Pachyderm* issues a status update with the most recent reports and estimates of numbers of rhinos in Africa. Further, it would be useful if AERSG regularly produced a list of the prioritized rhino projects, along with their costs, as an aid to fund-raising efforts and coordination.

BLACK RHINOS

1. The Workshop endorses the draft continental strategy for black rhinos in Africa formulated by the AERSG.

2. The Workshop reaffirms that the three major components of the conservation strategy for black rhinos consist of:

- (i) protection of the larger (more than 100 animals) populations in the wild;
- (ii) intensive *in situ* management of smaller (less than 100 animals) populations in the wild;
- (iii) *ex situ* programs, specifically captive propagation, to reinforce survival of wild populations.

3. As an interim strategy, until more is known about the genetic and ecological differences within the species, the Workshop recommends that the intensive *in situ* and the *ex situ* programs recognize four conservation units within the black rhino range:

- (i) the southwestern populations in Namibia;
- (ii) the southern-central populations extending from Natal through Zimbabwe and Zambia into southern Tanzania;
- (iii) the eastern populations in Kenya and northern Tanzania;
- (iv) the north-western populations extending from the horn of Africa to Central African Republic and Cameroun.

Ex situ and Intensive *in situ* programs should not mix animals from these four conservation units at this time.

4. Appropriate studies of evolutionarily significant differences, including both genetic diversity and ecological adaptations, are greatly needed for management decisions concerning both the wild and the captive populations. The Workshop recommends that such studies be conducted as soon as possible and be coordinated through the AERSG. Hence the Workshop recommends that necessary funds be recruited for these studies. Specifically, the Workshop urges that \$10 000 be sought by the zoo community, through the AAZPA SSP Species Coordinator, for the genetic studies of black rhino being conducted by Dr. Don Melnick in liaison with the AERSG. This \$10 000 would represent matching funds for the \$10 000 already offered by the New York Zoological Society to cover the estimated \$20 000 total cost of this project.

The Workshop also encourages both field and zoo programs to provide sample materials, as requested and where practical, to Dr. Melnick for these studies.

5. For the long-term conservation of the species, the Workshop urges continuation and extension of the analysis of demographic and genetic problems for the species in the wild through population modelling and decision analysis. The appropriate experts on both captive and wild communities should collaborate on these studies; African governments are encouraged to cooperate with these initiatives.

6. Considering principles of conservation biology, the Workshop acknowledges that a minimum, long-term objective for each of the recognized conservation units in the wild is a total population whose genetically effective size $N_e = 500$. Since the genetically effective size is usually much lower than the census number, minimum populations for each conservation unit larger than 500 will be required to achieve this objective. If it can be assumed (based on comparison with some other species that have been studied) that N_e/N ratios in the wild will be the order of 0.25, a minimum total population of 2 000 per conservation unit may be required to achieve the objective of $N_e = 500$.

Since four conservation units are being recognized, these considerations suggest a minimum viable population of at least 8 000 rhinos in Africa as an optimal long-term objective. The Workshop also realizes that it is impossible that a contiguous population of 2 000 within any conservation unit will build up in the foreseeable future. However, by interactive management of the several disjunct populations that will likely characterize each conservation unit, the overall N and N_e objectives of some of these combined populations should be achieved.

The Workshop observes that the total estimated population of black rhinos in Africa is less than half the total recommended minimum number of 8 000 and that only the southern-central populations are near the 2 000 MVP recommended for each conservation unit. Finally, it must be

emphasized that these recommendations are for minimum numbers. It is highly desirable that populations larger than the minimum be maintained.

7. Since the conservation units being recognized will extend across political boundaries, there will be a need for regional cooperation within Africa for the optimal integrated and Interactive management of the populations.

8. Recognizing the value of captive propagation as a back-up to *in situ* conservation, the Workshop recommends that action should commence immediately to establish viable foundations in captivity of the three conservation units of black rhinos not presently represented well in zoos. Genetic analyses suggest that a foundation for the captive population of each conservation unit optimally be at least 20 rhinos from the wild that reproduce in captivity. Only the East African populations are represented by this number of founders in zoos. The southern-central populations are represented by four founders at most. There are no known representatives of the southwestern or the northern-western populations currently in zoos.

Although the most endangered of the conservation management units is the northern-western population, acquisition of founder animals for all three conservation units not well represented in captivity should be pursued immediately and in parallel.

It is recommended that any new founders should be incorporated in the captive populations under auspices of the AAZPA SSP or similar management programs and should be placed in facilities with a proven record in black rhino reproduction.

9. Considering the plight of the northern-western populations, the Workshop urges that a rapid survey be conducted of these populations to determine what intensive *in situ* or *ex situ* action is possible and appropriate. It is recommended that the Chairman of the AERSG coordinate recruitment of a person or persons to conduct such surveys within the next six months. It is further recommended that recruitment of the financial support for such a survey will be coordinated by the AAZPA SSP Species Coordinator.

10. The Workshop observes that it will be desirable for *ex situ* programs and technology to be applied to conservation of black rhinos both in the African countries where the species occurs as well as in the zoos elsewhere in the world. Therefore, the Workshop agrees that the zoo community outside Africa should provide as much assistance as possible to African nations in developing intensive *in situ* management technology and facilities.

NORTHERN WHITE RHINOS

1. The Workshop recognizes that there are two conservation management units of white rhinos: the described southern and the northern subspecies. At present, the southern white rhino seems secure in the wild. However, the situation for the northern white rhino is critical. Although genetic studies are still inconclusive about the differences between these two units, it is believed the northern population should be conserved because of:

- (i) its probable ecological adaptations to the very different habitats it occupies compared to the southern populations;
- (ii) its probable resistance to endemic diseases not present in the range of southern populations;
- (iii) the possible genetic diversity the population contains for the species;

- (iv) the resources that have already been expended on its conservation, and the interest and willingness of Zaire to conserve the species;
 - (v) the flagship nature of the species for conservation in this region of Africa.
2. The Workshop recommends Integration of the conservation programs for the wild and captive populations. Ultimately, these programs are expected to entail exchange of genetic material between the wild and captive populations. Fewer than 15 founder animals are known to exist for both the small wild and captive populations. These founders are evenly divided between the wild and captive populations. However, over the short term it is recommended that no animals be exchanged between the wild and captive populations; at this time it is recommended that every effort be exerted to expand the wild and captive populations as rapidly as possible from their small founder bases.
 3. The Workshop endorses continued support for the *in situ* conservation programs in Garamba National Park. In particular, the Workshop believes that, in addition to the activity currently occurring, funds should be provided for a field biologist who can be deployed continuously in the Park with the rhinos. Further, the Workshop also strongly recommends that there be an intensive effort to train Zairois biologists to continue with these conservation programs into the future.
 4. With respect to expansion of the captive population, the Workshop acknowledges and commends the considerable efforts of Dvur Kralove, in collaboration with the IUCN/SSC CBSG, to enhance the captive breeding program, as reflected in the report and recommendations by CBSG chairman Dr. U.S. Seal and CBSG member Dr. D. Jones, issued after their visit to Dvur Kralove in February 1986. Many of these rec-

ommendations have been implemented, including some reproductive examination of females, the movement of a lone male rhino from London to Dvur Kralove, the initiation of a facility enlargement at Dvur Kralove, and collection of samples for genetic analysis.

However, further analysis and evaluation of both the captive and wild population emphasizes the urgent need to expand the captive nucleus as soon as possible. Concerns over the demographic risks of maintaining the entire captive nucleus in one facility have intensified.

Therefore, the Workshop recommends that Dvur Kralove consider movement of 112 adult animals to another facility with experience in breeding the southern white rhino. Further, the Workshop recommends that Dvur Kralove be requested to suggest a timetable by which, if further reproduction does not occur there, other relocations will be undertaken. The reasons for these recommendations relate to enhancement of reproduction and reduction of demographic risks, as will be explained more fully in a white paper to be prepared over the next few months by Dr. Jones and Dr. Seal.

5. The Workshop encourages the use of the southern white rhino for development of reproductive technology to help the northern white rhino.

6. The Workshop also encourages continued investigation of the genetic and ecological differences between the northern and southern forms. With respect to the genetic studies, both field and zoo programs are encouraged to provide sample materials as requested and where practical to Dr. O. Ryder and colleagues.

AFRICAN RHINO SYSTEMATICS

Session Chairman RAOUL DU TOIT

RATIONALE FOR INVESTIGATIONS OF AFRICAN RHINO SYSTEMATICS

Comments by David Western (New York Zoological Society)

To ensure that efforts to conserve rhinos in the wild as well as in captivity are maintaining the existing genetic diversity of the species, it is necessary to establish the "evolutionarily significant units" within the different species. In the case of the northern white rhino, there has been much debate over whether this "subspecies" is sufficiently different from the southern white rhino to merit the expense and effort required to maintain the last remaining population in the Garamba National Park, Zaire. Funds allocated to conservation of these northern white rhinos might be better spent on initiatives to conserve black rhinos, which have dwindled from about 15 000 at the time when this issue was first debated to a present level of under 4 000. The importance of subspecies designations thus requires critical review in order to assign priorities for rhino conservation action in Africa, but conservation initiatives need not be delayed while the necessary research is undertaken.

In debating the significance of genetic differences between allopatric groups of rhinos, it is necessary to consider not only the need to maintain the evolutionary potential of the species by preserving overall genetic diversity, but also the need to maintain genetic traits that constitute specific ecological adaptations, allowing some of the rhinos to thrive in

habitats which may be unfavourable for other members of the species. Attitudinal zonation of habitats in East Africa may be one important factor influencing ecological adaptations of rhinos.

A further aspect to consider in strategies for conservation in Africa is the likelihood that the recognition of a certain group of a spectacular "flagship species" as being different to other groups of the same species elsewhere gives impetus to national and International efforts to save those animals and their habitats — the effort to protect the mountain gorilla in Rwanda has been a case of this—"political" aspect of systematics.

THE EXISTING BASIS FOR SUBSPECIES CLASSIFICATION OF BLACK AND WHITE RHINOS

Summary of presentation by Raoul du Toit (IUCN African Elephant and Rhino Specialist Group)

The efforts of Hopwood (1939) and Zukowsky (1965) in revising black rhino systematics did not greatly improve the classification since these authorities erected subspecies on the basis of very small numbers of representative skulls, and in some instances the skulls representing their subspecies were those of immature animals (notably the subspecies *holmwoodi*). In view of these deficiencies, Groves (1967) produced a revision which identified 7 subspecies, but sam-