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NOTES ON THE MANAGEMENT OF RHINOS IN ZIMBABWE

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OVERVIEW

During the early 1980's Zimbabwe's black rhino population was the largest in Africa. Illegal hunting reduced this population from about 2 300 in 1980 to just over 250 in 1993. The poaching onslaught was perpetrated mainly by foreign gangs and was therefore particularly severe in the wildlife areas adjacent to Zambia, notably Zambezi Valley. While an antipoaching war was being waged by the Department of National Parks and Wild Life Management (DNPWLM), with major public and international support, a concurrent effort was made to translocate black rhinos to safer areas of private land state land. Some black rhinos were also exported to captive facilities in the USA, Europe and Australia

Translocated rhinos were consolidated into Intensive Protection Zones on state land, and conservancies on private land, in order to create free-range breeding groups with full genetic and demographic viability and with reasonable protection against poachers. Dehorning operations were undertaken to reduce the incentive for illegal hunting. These measures to protect, monitor and manage rhinos were successful to the extent that Zimbabwe's black rhino population has now recovered significantly. However, the rhinos' conservation status remains precarious.

Both species are classified as "Specially Protected" within Zimbabwe and this country has fully adhered to the relevant CITES provisions since rhinos were placed on CITES Appendix I in 1976. Every opportunity must now be taken to maximize the involvement of rural communities in rhino conservation rather than dealing with antipoaching through military measures alone.

THE POACHING CRISIS

The slaughter of black rhinos, undertaken mainly by commercial poaching gangs based in Zambia, commenced in the lower Zambezi Valley in 1983. These poaching activities then spread to the Sebungwe region within five years, and the Hwange-Matetsi region (with both black and white rhinos) thereafter began significant attrition of rhino populations.

In 1984 DNPWLM launched an aggressive antipoaching campaign (Operation Stronghold). During this campaign about 300 poachers were killed or captured, and four members of the Department lost their lives in protection of rhinos. However, the campaign proved to be a losing battle. With men being very thin on the ground (a scout density of no more than one scout per 140 sq km was present in these extensive rhino areas), and with crippling budget constraints, there was no chance of shielding the rhinos from poachers, no matter how energetically and bravely this task was tackled. The situation worsened with the advent of the Economic Structural Adjustment Programme, which required (for instance) that DNPWLM retrenched 261 scouts. By 1992 the lower Zambezi Valley (which in the mid-1980's had the world's largest rhino population) was almost completely depleted of its rhinos.

DEVELOPMENT OF RHINO CONSERVATION STRATEGIES

DNPWLM has produced successive rhino conservation strategies and action plans since 1990, with the major objectives being elaborated as follows.

- Maintenance of viable populations in the Parks and Wild Life areas (state land);
- Establishment of translocated breeding nuclei elsewhere in Zimbabwe;
- Development of captive breeding centres in Zimbabwe;
- Contribution to the overseas coordinated captive breeding programme;

- Undertaking a nation-wide dehorning programme;
- Development of legal economic value for rhinos.

Each of these components is dealt with in turn below.

MAINTENANCE OF VIABLE POPULATIONS ON STATE LAND

The continued loss of rhinos in the Zambezi Valley led to the realization that rhinos in the wild could not be protected from poaching with the patrolling manpower available to DNPWLM, and the concept of Intensive Protection Zones (IPZs) was therefore developed. Certain areas of state land that had reasonable numbers of rhino were designated as IPZs, where game scout numbers would be increased to the level where effective protection could be given (about 1 man/20 sq km). These manpower levels could only be achieved by transfer of scouts from other areas. Within IPZs, efforts are made to monitor rhinos closely and radiotracking projects have been undertaken to facilitate this.

Since rhinos outside IPZs could not be afforded adequate protection from poaching, the strategy called for capture of any rhinos on State Land outside IPZs and their translocation into IPZs and areas of private land where adequate protection could be given.

Increased support for antipoaching was given when the Zimbabwean Government launched "Operation Safeguard Heritage" in November 1993, which set up a national antipoaching campaign involving all units of the security forces, as well as DNPWLM. Members of the national army and police are now used to boost DNPWLM patrols whenever possible.

Four IPZs have now been established and contain a total of over 110 of Zimbabwe's black rhinos.

ESTABLISHMENT OF TRANSLOCATED BREEDING NUCLEI

The majority of black rhinos which are on private land were moved from the Zambezi Valley in the early 1980's when rhinos were still abundant on state land. At the same time large numbers of rhino were moved into Hwange National Park. It was considered good strategy to develop secondary breeding nuclei as a form of ultimate insurance - it was not expected that the Zambezi Valley population could ever become extinct.

Since 1990 the major efforts in rhino management have been in collecting up "stragglers" and moving them into the four IPZs on state land. Very few rhinos have been moved from state or communal land to private land in recent years and this has only happened where it was the most practical option. The recipient landowners are viewed as voluntary custodians and the ultimate management authority for the rhinos (as Specially Protected Animals) has remained vested in DNPWLM.

DNPWLM has encouraged the formation of "conservancies" (amalgamations of ranches into large complexes without internal game fencing) in order to facilitate rhino conservation. Large conservancies present the following opportunities and advantages:

- Coordinated antipaoching and monitoring;
- Large enough areas to allow rapid expansion of founder breeding groups;
- Financial sustanability of the rhino conservation effort.

The white rhinos on private land are the result of private importations from South Africa.

Today about 60% of the black rhinos and 30% of the white rhinos in Zimbabwe are on private land.

DEVELOPMENT OF CAPTIVE BREEDING EFFORTS WITHIN ZIMBABWE

Captive breeding of black rhinos is expensive and entails significant management problems (especially nutritional and behavioural difficulties). Nonetheless, some individuals and agencies have wished to attempt this approach within Zimbabwe and captive breeding efforts were therefore established on private land at Chipangali and Imire in 1986-87.

To date, the success of these initiatives in facilitating the growth of the national population has been very limited but they remain as experimental components of the national strategy.

SUPPORT FOR OVERSEAS CAPTIVE BREEDING PROGRAMME

As a back-up to conservation measures within Zimbabwe a coordinated captive breeding programme has been set up by various zoos in America, Europe and Australia. Between 1982 and 1994, 35 black rhinos were exported to United States of America (24), Australia (9) and Germany (2). Although the individual zoos have collaborated with each other to maximize breeding, the overall population growth rate for rhinos from Zimbabwe for the period 1982 to February 1996 was zero. Further exportation of Zimbabwe black rhinos is not envisaged at present.

DEHORNING

At the height of the poaching crisis an extensive dehorning programme was undertaken as a disincentive to the poaching activities. Over 400 rhinos were dehorned. These operations were not seen as a standalone solution to poaching, especially since the horns regrow at a rate of about 6cm per year. When undertaken in combination with the consolidation of manpower within IPZs, dehorning does appear to have contributed to the reduction in rhino poaching within Zimbabwe. Potential biological or behavioural effects of dehorning have been monitored.

DEVELOPMENT OF AN ECONOMIC VALUE FOR RHINOS

Zimbabwean representatives at international fora such as CITES conferences have repeatedly called for an objective assessment of the potential advantages and disadvantages which would be associated with the inception of a legal trade in rhino products. This assessment is called for in view of the opportunities that a controlled trade would provide for generating funds for field protection efforts, in accordance with Zimbabwe's philosophy of sustainable use rather than simplistic preservation of wildlife resources. The ban on international trade in rhino products has not been effective to date and it is probably unrealistic to hope to curtail the end-user markets in the foreseeable future. Economic incentives for the positive involvement of rural communities in rhino protection are urgently required. While hoping for impartial investigation of this issue, the Zimbabwean Government has adhered strictly to CITES provisions by registering and keeping rhino horns in a safe stockpile and not allowing the sale or use of these horns, which now total over 3,5 tonnes.

Opportunities to maximize the non-consumptive value of rhinos, through tourism, have been encouraged whenever possible and provide much of the rationale for the custodianship scheme on private land.

MANAGEMENT TARGETS

In the Black Rhino Conservation Project Emergency Plan, produced in 1993 by DNPWLM for the establishment of IPZ's,

the immediate management objective of the IPZ's was stated as being to:

"Maintain a population of at least 100 free-ranging but individually monitored black rhinos in the Parks Estate, with an annual growth rate of at least 3% per annum and with no significant loss of genetic diversity".

While this target growth rate is low, it was seen as realistic in view of the prevailing poaching pressure and this demographic objective has in fact been attained in recent years. A higher demographic target of 5% annual growth has been set for the breeding groups on private land. In the private land situation, management effort and donor funds have been directed towards redistributing rhinos to create viable breeding groups in areas with suitable habitat and adequate security, whilst minimizing inbreeding risks.

The private sector endeavour as well as the IPZ endeavour should be viewed as emergency responses, to stabilize the conservation status of the species within Zimbabwe in accordance with fundamental management principles which are outlined below. Now that the situation has been stabilized, it is opportune to develop longer-term objectives for a rhino conservation strategy which deals with the various private land and state land projects within an overall metapopulation breeding programme, instead of as separate operations.

In redistributing rhinos, a balance must be found between two strategic requirements that contradict each other. One of these is the need to "spread eggs in different baskets" in order to allow for some buffering against poaching onslaughts and against stochastic environmental pressures (such as drought and disease) that may conceivably arise. The contradictory requirement is to derive economies of scale by keeping rhinos in a few larger groups rather than in numerous smaller groups. This consolidation of rhinos will greatly reduce the need for the intensive, risky and costly management that will be required to avoid the stochastic demographic perturbations and genetic problems that become acute at very low population sizes. Consolidation also allows for the concentration of available manpower, equipment and donor funding for rhino protection and management.

GENETIC AND DEMOGRAPHIC MANAGEMENT PRINCIPLES

In accordance with IUCN recommendations, emphasis is placed on the establishment of breeding groups which each consists of over 25 founders, in free-ranging breeding contact, within areas of sufficient carrying capacity to allow unrestricted and rapid population expansion to over 100 rhinos in each area, this strategy has a high probability of maintaining a healthy level of genetic diversity in future generations.

Even in subpopulations with 25 or more founders, there will be some loss of genetic variability as a consequence of unavoidable genetic drift and limited inbreeding. To compensate for this, the genetic management plan stipulates the addition of at least new effective breeder to each subpopulation every generation (i.e. every 10-15 years).

While the size of each founder group is crucial, it is equally important to maximize the rate of population growth once the subpopulation has been established. Rapid population growth will avoid a "genetic bottleneck" because the initially small number of breeding animals will achieve a high rate of genetic transfer to subsequent generations. As previously mentioned, an average net growth of 5% per annum (corrected for translocations in and out) has been set as the minimum acceptable rate for breeding groups on private land. Should this benchmark not be attained, then translocation of the rhinos to areas which have shown better growth rates is called for, unless mitigating factors (such

as unfavourable age or sex ratios) are apparent.

Areas containing over 25 founders in free-range contact, with sufficient carrying capacity to allow unrestricted population expansion to over 100 rhinos in each area, are referred to as "large breeding groups". The second class of breeding situations is referred to as "satellite breeding groups". These areas have less than 25 founders and additional management is required to prevent loss of genetic diversity through inbreeding and genetic drift. There are also carrying capacity limitations which preclude the growth of most of these subpopulations to over 100 rhinos in each area.

The Zimbabwean rhino breeding plan does not reflect much confidence in artificially enhanced breeding techniques, either at present or in the near future. Techniques such as artificial insemination and embryo transfer are still a long way from successful implementation, even in the controlled environments of zoos with semi-tame rhinos. Additionally, a host of rhino management problems have severely constrained captive breeding efforts in other countries. Because breeding of rhinos under free-range conditions is clearly more cost-effective than captive breeding, in terms of net population growth as well as financial investment, DNPWLM abandoned its original intention (as stated in the 1992 Black Rhino Conservation Strategy) of setting up its own *in situ* captive breeding facility.

RHINO STOCKING RATES

The experience gained in establishing translocated breeding groups in Zimbabwe, and elsewhere in southern and eastern Africa, shows that extreme caution must be exercised to avoid density-dependent nutritional or behavioural problems from arising. A black rhino is a non-gregarious megaherbivore with more specific browse requirements than an elephant, for instance. The species therefore has to be carefully managed in accordance with social carrying capacity constraints as well as ecological carrying capacity constraints.

Intraspecies fighting has arisen as a problem in all age and sex categories of black rhinos. This risk of fighting is clearly related to the rhino stocking rate. In Zimbabwe, it is prudent to minimize translocations of any rhinos to areas that are already stocked at densities greater than one rhino per 10 km², while for translocations of adult bulls the density of resident bulls should not exceed one per 25km². The fighting problems associated with redistribution of rhinos give additional priority to the establishment of large breeding groups in extensive areas (ideally over 1 000 sq km) instead of incurring the risk associated with more intensive management of satellite breeding groups.

Apart from the loss of rhinos through fighting in overstocked areas, there is less obvious but equally serious loss of biological productivity as a consequence of the increased intercalving intervals and the older age of first conception of undernourished cows. The term "maximum production carrying capacity" (or "economic carrying capacity") is used to refer to the stocking rate at which fecundity is maximized; this is presumed to be about 75% of absolute ecological carrying capacity. Based on the performance to date of translocated breeding groups, and allowing some leeway for droughts, frosts, veld fires, etc. that may create abnormal browse shortages, the "safe" stocking rates which are presently recommended for maximum production are 1 adult rhino per 10 km² in Lowveld areas and 1 adult rhino per 15 km² in Middleveld areas.

Since rhinos are relatively slow breeders, it would take several years to see if the rate at annual population growth of a subpopulation is reducing to the extent

iat overstocking is confirmed. The loss f reproductive potential during this eriod would be unacceptable, and ierefore Zimbabwean rhino manage- ient must be proactive rather than :active in terms of annual recruitment ites. A proactive approach requires iat conservative stocking rates are iaintained and that early action is taken there are indications of overutilization f key browse resources or loss of body ondition. The action to be taken in- ariably entails translocations to areas ith sufficiently low population densi- es.

HINO MONITORING

has been policy to maintain individual :cords for each rhino, on private land s well as in IPZ's. The extent to which iis is being achieved is variable. Indi- idual rhino monitoring is being under- ken at a high level of reliability for bout half the total population at resent. Within IPZ's, monitoring has :pended heavily upon radiotelemetry :cause staff shortages preclude more irect, regular observations of every iino. Radiotelemetry has also proven be a cost-effective adjunct to the onitoring efforts in conservancies. hus there is a clear rationale for the ontinuation of research into diocollars which suit the challenging :haviour al and physical characteris- :s of black rhinos and which have di- ct antipoaching applications as well the more conventional scientific ap- ications. Spoor recording systems are so being developed as an aid to moni- ring.

ie detailed monitoring which is pres- ently being achieved, particularly in the large lowveld conservancies, can be maintained only through regular updating of the identification records and through ear notching of subadult rhinos. A consistent ear notching system was devised and is linked to a national identity numbering system. Rhino custodians are urged to give names to all the rhinos on their properties, and to liaise with their neighbours over the naming and monitoring of these rhinos to avoid "double counting", undetected rhino absences or other such problems. Injectable microchips (transponders) have been routinely implanted in the horn bases and foreheads of rhinos which have been immobilized for translocation, dehorning, radio collaring, etc.

Rhino monitoring at this level of detail is essential in order to track breeding histories and to thereby monitor interbirth intervals, relatedness and other genetic and demographic parameters. The monitoring also ensures that all rhinos are regularly accounted for. The scouts who are charged with the rhinos' protection therefore realize that any unreported poaching losses will be detected before long and that they will then be implicated in illegal activity or at least in failure to perform their monitoring duties.

IMPROVEMENTS ON LEGISLATION

Zimbabwe gazetted the Protection of Wildlife (Indemnity) Act in 1989 to cover Government staff engaged in rhino protection

and amended the Parks and Wildlife Act in 1989 to impose deterrent mandatory penalties of a sentence of five years in prison and/or a fine of Z$15 000 for illegal killing of rhinos and possession of rhino horn. The Indemnity Act does not cover private game guards.

INCENTIVES AND REWARDS FOR PREVENTING RHINO POACHING

DNPWLM has continually sought to improve the conditions of service of its men in the field, since these conditions are not equivalent to those of soldiers or policemen although the game scouts contend with similar risks and hardships while undertaking their duties. Staff accommodation, other infrastructural requirements and equipment should be improved under the new funding arrangements for DNWLM, which allow for the retention of revenue raised from the Parks Estate instead of the loss of most of this revenue to central treasury. The internal cycling of funds should also enable the prompter payment of field duty allowances.

The offering of substantial rewards to members of the public for information on rhino poaching is a key element of the detection screen around the large conservancies.

THE FUTURE

The success of Zimbabwe's rhino conservation effort may well be transient if the opportunity is not taken now to develop a truly holistic approach towards the poaching threat. In particular, a community awareness programme must be intensified and local communities must, wherever possible, be given some meaningful stake in the conservation of rhinos in order to develop a more conducive social environment for the long-term recovery of the species. This would be easier to achieve if the legal economic value of rhinos could be enhanced.

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