
Abstracts

Finances: the vital factor in rhinoceros conservation

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The use of land in any way whatsoever, involves intrinsic costs for both individuals concerned and society as a whole. The appreciation of this cost factor, however, is absent from most conservation literature and discussions to date. This glaring omission is illustrated by means of a brief historical overview of the founding and development of Africa's important national parks, which came into existence in the early years of the 20th century, without taking the then prevalent demographic and economic pressures into consideration. Failure to appreciate the importance of these pressures (especially financial) has contributed to the false belief that conservation can be undertaken without regard for cost. Under present-day circumstances, the cost of conserving wildlife must obviously be related to the cost of the land and the resources involved. Failure to meet the minimum funds required means that all expenditure less than that minimum is wasted.

Towards a black rhinoceros *Diceros bicornis* translocation strategy to meet the aims of the conservation plan for the species in South Africa and the TBVC states¹

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Black rhinoceros *Diceros bicornis* (Linnaeus, 1758) population growth must be maximised to meet the goals of the South African conservation plan for the species. Translocation forms the key to achieving increased growth, and this paper outlines a suggested translocation strategy to meet the goals of the conservation plan. Improved data on population size, age and sex structure are prerequisites for scientific management. Changes in the annual rate of population increase, after the effects of rainfall and birth-lag effects have been statistically removed, will provide the best indicator of when animals should be moved. We propose that in the absence of heavy poaching, captive breeding should only be considered in South Africa for orphaned animals, injured animals with little chance of survival in the wild, and treated injured animals whose condition deteriorates after being re-released into the wild. Removals in future should be more selective for age class.

Animals younger than six years old are the prime animals for translocation. The use of a microlight aircraft to search for specific animals may reduce capture costs in future. Re-estab-

lishing populations should be given preference until the desired number of founders have been introduced. Only then should new populations be established. If the principles of the conservation plan are adopted, new populations will only need to be founded in about six years.

¹ Republics of Transkei, Bophuthatswana, Venda, and Ciskei.

² A joint project of the Natal Parks Board, the Southern African Nature Foundation (representing the World Wide Fund for Nature (WWF) in southern Africa), the Endangered Wildlife Trust, and Total (South Africa).

Status, history and performance of black rhinoceros *Diceros bicornis* populations in South Africa, the TBVC states¹ and Namibia

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The widely publicised decline of the black rhinoceros *Diceros bicornis* (Linnaeus, 1758), and the battle to save it from extinction, has centered on rapidly dwindling populations of Zimbabwe, Central and East Africa. It is not widely known that one third of the world's remaining 3 000 black rhinoceros now occur in the region comprising South Africa, the TBVC states and Namibia. The majority of these populations have increased in recent years. However, no-one actively concerned with rhinoceros has any delusions about the seriousness of the threat facing the region's rhinoceros, black and white. Recent poaching of black rhinoceros in Namibia, and white rhinoceros *Ceratotherium simum* (Burchell, 1817) in Swaziland is cause for grave concern.

Three of the four recognised subspecies *Diceros bicornis bicornis* (Linnaeus, 1758), *D.b. minor* (Drummond, 1876), and *D.b. michaeli* Zukowsky, 1964 occur in the region. A knowledge of each population's status and relative performance is a precursor to improving management of these populations on a strategic, rather than on a parochial single reserve or conservation organisation basis. Comparisons between the performances of various populations are of particular management interest. To allow such comparisons, the mean annual rates of increase of the various populations were estimated using standard methods. It was generally not possible to compare population performance between areas using the literature. Quoted performances either used different measures and calculation methods, or did not exist.

For this paper, Brooks (1989) was used as a major source of census information. The census method used, and an indication of the precision of the estimate are given where possible. Much of the data on the history of the different populations is scattered throughout the literature. By including a brief history of each population, it was endeavoured to make this information accessible in a synthesised form.

BROOKS, P.M. 1989. Proposed conservation plan for the black rhinoceros *Diceros bicornis* in South Africa, the TBVC states and Namibia. *Koedoe* 32(2): 1-30.

¹ Republics of Transkei, Bophuthatswana, Venda, and Ciskei.

² A joint project of the Natal Parks Board, the Southern African Nature Foundation (representing the World Wide Fund for Nature (WWF) in southern Africa), the Endangered Wildlife Trust, and Total (South Africa).

Distribution and monitoring of black rhinoceros *Diceros bicornis* populations in Zimbabwe

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The historical distribution of the black rhinoceros *Diceros bicornis* (Linnaeus, 1758) in Zimbabwe and early translocation programs together with estimates of rhinoceros numbers are given (Child & Savory 1964; Roth 1967; Kerr & Fothergill 1971). The approximate nature of the population estimates in the past reflects the lack of specific rhinoceros surveys in the major rhinoceros refuges. Because reliable and cost-effective aerial survey techniques had not yet been developed for rhinoceros counts in Zimbabwe, estimated rhinoceros figures have generally been based on appraisals of ground sightings, signs and other data collected in an unsystematic way, or on incidental sightings during aerial surveys carried out to count elephant *Loxodonta africana* (Blumenbach, 1795).

However, since 1978 aerial surveys — conducted by the Department of National Parks and Wild Life Management — have become standardised in accordance with modern survey methodology. The need for a cost-effective technique for rhinoceros monitoring has become particularly urgent as a result of the uncertainty over the long-term success of the anti-poaching effort in the Zambezi Valley. A joint Department of National Parks and Wild Life Management /World Wide Fund for Nature (WWF) rhinoceros monitoring project in this area commenced in 1988 and a suitable survey methodology is being developed. A new technique, utilizing an advanced microlight aircraft (CRM Shadow) operating within predetermined blocks, is being tested. The purpose of this approach is to derive correction factors to correlate aerial observations with data derived on the ground. The present (1987/1988) distribution of black rhinoceros, as well as population estimates in Zimbabwe is given in Table 1.

Table 1
*Black rhinoceros population estimates
in Zimbabwe (1987/1988)*

Zambezi Valley complex (Mana Pools National Park, Urungwe, Sapi and Chewore Safari Areas)	500 — 1 000
Matusadona National Park	200 — 250
Chizarira National Park	200 — 300
Chete Safari Area	150
Remainder of Sebungwe region (including communal lands)	100
Hwange — Matetsi area	250
Gona-re-Zhou National Park	20
Matopos (Matobo) National Park	12
Ranches in Midlands area	50
Ranches in Chiredzi area	25
Ranches in West Nicholson area	14
Other private land	50
	1 550 — 2 200

CHILD, G. and C.R. SAVORY. 1964. Distribution of large mammal species in Southern Rhodesia. *Arnoldia* 1 (14): 1-15.

KERR, M.A. and R. FOTHERGILL. 1971. Black rhinoceros in Rhodesia. *Oryx* 11 (2-3): 129-134.

ROTH, H.H. 1967. White and black rhinoceros in Rhodesia. *Oryx* 9 (3): 217-231.

Census and marking systems for black rhinoceros *Diceros bicornis* with special reference to the Zululand game reserves.

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Individual recognition of black rhinoceros *Diceros bicornis* (Linnaeus, 1758), based on morphological peculiarities (such as the shape of the horns, features of the ear, wrinkles round the eyes) was documented by the author in great detail since 1961 to obtain data on rhinoceros movements and the life histories of mature females in the Hluhluwe Game Reserve. This method of identifying individual animals has been continued and developed over the years and has been applied to black rhinoceros in other game reserves in KwaZulu as well, resulting in a record of some 500 individually recognisable animals.

Other workers have also used the individual recognition method to monitor various aspects of black rhinoceros biology (Klingel & Klingel 1966; Goddard 1966, 1967; Hamilton & King 1969; Western & Sindiyo 1972; Hall-Martin & Penzhorn 1977; Leader-Williams 1985).

In addition to natural features, black rhinoceros have been marked by using ear tags (Hamilton & King 1969; Hanks 1969), ear notching, radio transmitter (Anderson & Hitchins 1971; Hitchins 1971), horn branding (Hanks 1969), and collars (Thompson 1974).

The horn, ear and tail characteristics of the black rhinoceros population in the Hluhluwe/Umfolozi game reserve complex is shown in Table 1. In the Hluhluwe Game Reserve animals were ear-marked with different materials (tags, streamers and discs). Table 2 illustrates that the 'jumbo roto tag' and Ketchum metal tags are better marking methods with an average life span of 314 and 232 days respectively.

Population estimates of black rhinoceros using fixed-wing aircraft are unreliable in wooded habitats with 12,2 percent of the population being recorded (range 4,9 to 18,1). This species is difficult to detect from the air especially in poor light and when seen against the sun. Helicopters give a far better result (44,8 percent of total population, range 9,8 to 60,0) due to the noise factor which stimulates the animals to move out of cover ahead of the approaching aircraft. An additional and extremely important advantage of using a helicopter is its manoeuvrability enabling an observer to record the characteristics of the individual rhinoceros.

Table 1
Horn, ear and tail characteristics of the living adult black rhinoceros population in the Hluhluwe/Umfolozi game reserve complex in 1973 and 1985.

	MALES				FEMALES			
	1973		1985		1973		1985	
	N	%	N	%	N	%	N	%
HORNS: anterior longer than posterior	117	97,5	58	100,0	85	80,2	46	66,7
	3	2,5	—	—	15	14,1	20	29,0
	—	—	—	—	6	5,7	3	4,3
EARS: normal	55	45,8	28	48,3	78	73,6	49	71,0
	57	47,5	29	50,0	28	26,4	16	23,2
	8	6,7	1	1,7	—	—	4	5,8
TAIL: normal	99	82,5	55	94,8	101	95,3	65	94,2
	15	12,5	—	—	2	1,9	2	2,9
	6	5,0	3	5,2	3	2,8	2	2,9

Table 2
Ear tag and streamer loss in the black rhinoceros in Hluhluwe game reserve.

Marking method	n	No. days before loss:	
		Range	Average
Metal or Fibreglass discs	5	86-171	130
Jumbo roto tag	8	81-506	314
Ketchum metal tag	5	141-473	232
Ear streamer: jess knot	3	132-1987	165
Jumbo roto plus streamer	7	141-163	155
Ketchum metal tag plus plastic disc	5	28-171	90
Visotag	2	33-82	58

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The Auxiliary Game Guard System in northwestern Namibia and its role in black rhinoceros *Diceros bicornis* conservation

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In 1970, on the recommendations of the Odendaal Commission (appointed in 1962 by the South African government), the Kaokoveld and the western extension of the Etosha Game Park were deproclaimed in order to create homelands for the Herero and Damara speaking people residing in north-western Namibia. At that time, the deproclaimed area of some 16 000 km² had well in excess of 1 000 elephants *Loxodonta africana* (Blumenbach, 1797) and possibly more than 300 black rhinoceros *Diceros bicornis* (Linnaeus, 1758). In spite of assurances that measures would be taken to protect the wildlife of the region, nothing was done, and large-scale illegal hunting — including the poaching of elephant and black rhinoceros for ivory and horn — commenced during the early 1970s.

During the severe drought of 1980-82, more than 80 percent of the region's cattle, as well as large numbers of small stock succumbed having a serious effect on the pastoralist economy of the Herero, Himba and Damara people, leaving many of them destitute. The local tribesmen of Kaokoland and Damaraland now had the motivation and means to hunt big game as a means of subsistence. Towards 1981 both elephant and rhinoceros had been extirpated throughout virtually the whole of Kaokoland (Owen-Smith 1984).

In the late 1980s the Namibian Directorate of Nature Conservation took over the responsibility for nature conservation in Namibia's communal areas. Concerned about the critical conservation situation in northwestern Namibia, the Namibia Wildlife Trust, the Endangered Wildlife Trust, the People's Trust for Endangered Species (U.K.), the Foundation to Save African Endangered Wildlife (New York), the Wildlife Society of South West Africa, mining and business houses as well as concerned private individuals joined forces to assist the Directorate's anti-poaching campaign in the region. It was understood, however, that the cooperation of the local Herero headmen of southern and western Kaokoland in such a venture was most essential. After prolonged discussions, the Auxiliary Game Guard System (AGGS) was devised. It exploited the knowledge and experience of the local population for the benefit of conservation on the one hand, while on the other hand, it provided basic living commodities to families that were struggling to build up their flocks after the drought.

With the onslaught against the black rhinoceros in Africa moving steadily southward, the role the AGGS has played and will play before and after independence in Namibia is crucial to the success of a protection strategy for the black rhinoceros in northwestern Namibia.

OWEN-SMITH, G. 1984. Namibia's most valuable resource. *Quagga* 7: 8-11.

Black rhinoceros *Diceros bicornis* capture and translocation techniques as used in Etosha National Park

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Since the appointment in 1953 of a full-time researcher in the Etosha National Park the scientific activities within the park have greatly increased in extent and scope, especially as far as capturing and translocation of game are concerned (Ebedes 1966; Hofmeyr 1975; Hofmeyr & De Bruine 1973; Ebedes, Leibnitz & Joubert 1977). These developments have also been prompted by the decline in the black rhinoceros *Diceros bicornis* (Linnaeus, 1758) population in Namibia, necessitating the development of capture and translocation techniques.

During the 1960s the late Bernabe de la Bat, then Director of the Department of Nature Conservation and Tourism of SWA/Namibia, became concerned about the continued survival of black rhinoceros in that country. At that stage the entire population consisted of 90 animals (Schoeman 1984), all of which were in the northwestern part of the country in an area over which the department had no jurisdiction, and where poaching was rife. Under de la Bat's direction a capture and relocating programme was initiated. A total of 43 black rhinoceros were caught (Hall-Martin, Walker & Bothma 1988) in Kaokoland and released in the Etosha National Park (as defined by the Odendaal Commission). In 1984 there was a viable population of over 300 animals in the park (Schoeman 1984). The launching of this far-sighted, significant and successful undertaking to conserve the black rhinoceros in this part of Africa secured the well-being of the species in this area.

Had this action not been taken, it is likely that many of these animals would have been shot, and Etosha would not have had one of the largest populations in Africa today. This exemplary result could not have been achieved without the development of an effective capture and translocation technique which was undertaken by the Department and implemented and streamlined over the years.

EBEDES, H. 1966. Gemsbok and black rhinoceros immobilisation with M99. Report No 48, Reckitt & Sons Ltd, Hull.

EBEDES, H., E. LEIBNITZ and J. JOUBERT. 1977. The immobilisation of wildebeest *Connochaetes taurinus* with etorphine and the use of diprenorphine as an etorphine antagonist. *Madoqua* 10(1): 71-73.

HALL-MARTIN, A.J., C. WALKER and J. DU P. BOTHMA. 1988. *Kaokoveld. The Last Wilderness*. Johannesburg: Southern Books.

HOFMEYR, J.M., and J.R. DE BRUINE. 1973. The problems associated with the capture, translocation and keeping of wild ungulates in South West Africa. *Lammergeyer* 18: 21-29.
SCHOEMAN, A. 1984. *Skeleton Coast*. Johannesburg: Southern Books.

The role of non-governmental organisations in black rhinoceros *Diceros bicornis* conservation in Africa

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The role played by non-governmental organisation (NGOs) in conservation is important and there is a wealth of data testifying to the success of NGOs around the world. These organisations are often the bridge that spans the divide between funds available from the private sector and the financial needs of a project necessary to achieve success. Today, many government agencies are not always able to devote money to the full range of environmental issues that need attention.

Non-governmental organisation activity today is most obvious in Botswana, Kenya, Malawi, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. The NGOs in the countries mentioned have all to a greater or lesser extent been active in rhinoceros conservation during the past decade. In southern Africa, the NGO movement contributed to black rhinoceros *Diceros bicornis* conservation by

- providing vehicles and operating funds (as a joint project with the Directorate of Nature Conservation and Recreation Resorts in Namibia) for the establishment of the Auxiliary Game Guard System in the Kaokoveld;
- translocating black rhinoceros from the Etosha National Park to the national parks of Augrabies and Vaalbos;
- funding research for aerial surveys in the reserves of KwaZulu; and
- moving a number of animals from Zimbabwe to Swaziland.

However, NGOs, as a matter of urgency, must explore alternative avenues in order to reverse the imposition of alien cultural and social attitudes on the people of Africa which has resulted in much hostility towards conservation areas and wildlife. The NGOs have also avoided addressing the one burning issue which is probably the root cause of the decline of *Diceros bicornis* in Africa, i.e. the economic traffic in rhinoceros horn. The notable exception is the World Wide Fund for Nature (WWF) which has worked in this field for many years.

How cost-effective have the NGOs been? There are many NGOs active in the conservation of the black rhinoceros and to put a figure on what has collectively been spent and how successful they have been since 1980 when the African black rhinoceros numbered 14 795 and to view the figure now of less than 3 700, is difficult. On a business balance sheet, we appear to be heading for insolvency. Just as the situation approaches crisis proportions for the rhinoceros and those charged with their safe-keeping, we in the NGO movement must rise equally to the challenge and if it is imperative for us to review our strategies, then we must do so, and do so quickly. A list of funding provided by NGOs to rhinoceros conservation projects, is shown in Table 1.

It is easy to be critical when you live in a country that has not had the same problems as other African states insofar as poaching is concerned, but let us take heed that the potential for poaching is here and so too is the illegal trade in rhinoceros horn. I have no doubt that support from the NGOs will increase. Whilst it could be argued that money has been wasted, this must be viewed in the light of placing most of the money into the traditional methods of protecting rhinoceros. Against this background, the Kaokoveld project must stand out as a good example as mentioned earlier, not only in the approach taken through the Auxiliary Game Guard System, but in the relatively low cost expended to achieve results. It is, however, fair to say that circumstances will vary from area to area and one should not draw any definite conclusions from this example. I merely use it to illustrate what can be achieved

by way of a different approach. The black rhinoceros in the Kaokoveld is, as we know, increasing as a result.

Table 1
Rhinoceros projects undertaken by NGOs in sub-Saharan Africa as at 22 March 1988. Data supplied by WWF. Expenditure expressed in USA\$

Country	Project title	Expenditure	Extension
Uganda	— Conservation of white rhinoceros	190,495	0
Zimbabwe	— Reintroduction of white rhinoceros	1,212	0
Kenya	— Introduction of white rhinoceros in the Meru ADC Game Reserve	36,300	0
Zimbabwe	— Ghona-Re-Zhou Game Reserve, Black rhinoceros protection	33,800	0
Tanzania	— Support for Tanzanian sub-group of IUCN/SSC	8,945	0
Zambia	— Save the Rhino Trust	839,464	0
Uganda	— Ajai Sanctuary, conservation of rhinoceros	8,778	0
Tanzania	— Anti-poaching equipment for national parks	113,418	0
Tanzania	— Lake Eyasi, anti-poaching camp	48,134	0
Zaire	— Garamba National Park, protection of rhinoceros	1,046,526	0
Botswana	— Translocation of white rhinoceros	15,314	0
Africa	— Support to the African Elephant and Rhino Specialist Group	25,022	25,000
Kenya	— Development of Nakuru Rhino Sanctuary	234,546	25,000
Kenya	— Lewa Downs Ranch, Ngare Sirigon Rhino Sanctuary	51,179	50,000
Kenya	— Laikipia Ranch, black rhinoceros conservation	137,724	60,000
Zimbabwe	— Black rhinoceros conservation	40,500	850,000
Zimbabwe	— Research on components of black rhinoceros conservation strategy	16,500	0
Total:		2,847,857	1,010,000

Development of an intelligence/information network to counter poaching and the illegal trade in trophies

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To counter and control poaching and the illegal trade in trophies within a country or between countries, implies constant liaison among the various law enforcement agencies concerned and the nature conservation bodies affected by these illegalities. An effective network to counter such activities can not be established on an ad hoc basis, but should be planned and coordinated thoroughly.

Trafficking of, dealing in, and smuggling of rhinoceros horn (and other trophies) are problems usually dealt with by means of cooperation and joint action by police and customs departments. On their own, nature conservation agencies can never succeed in countering these problems. Neither can police and customs departments expect a high rate of success if they operate without the cooperation of the nature conservation bodies. Without information, which is the key to success, and without willing participation and liaison, the creation of an intelligence/information network to counter poaching and the illegal trade in trophies will be impossible. Various ways of procurement and evaluation of information are discussed. It should be kept in mind that information, and especially information of a sensitive nature, is not cheap. Therefore, it is necessary to place a monetary value on the objective, in this case to save the rhinoceros from extinction.