

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/Umfolozzi 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 manoueverability 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/Umfolozzi 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.

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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 Bemabe 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.

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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