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# A last chance to save the northern white rhino?

Kes Hillman-Smith, Mankoto ma Oyisenzoo and Fraser Smith

**The northern subspecies of white rhino *Ceratotherium simum cottoni* is very close to extinction. Probably fewer than 50 remain in the wild and only 13 are known in captivity. Garamba National Park in northern Zaire contains the only potentially viable group, of 15–20 individuals, and here there is a possibility of action to save them.**

The northern white rhino was first made known to the scientific world in 1903, when one that had been shot near Lado on the White Nile in Sudan was exhibited (Sydney, 1965). The subspecies was first described by Lydekker in 1908 from a skull obtained by Powell-Cotton. Northern white rhinos were subsequently discovered to be fairly numerous, although their distribution was local, probably determined not only by human settlement, but also by suitable habitat of grassland, sparse savanna woodland, and available water. They occurred in southern Chad, the northern and eastern Central African Republic, south-western Sudan, northeastern Zaire and north-western Uganda (Sydney, 1965).

Within recorded history, there have been no white rhinos known between the southeastern limits of the northern subspecies—the River Nile, northern Zaire and Uganda—and the northern limits of the southern subspecies—the Zambesi River—a distance of some 2000 km. The most recent record is a cave painting in Tanzania dated at 34,000 years old. A possible previous continuous range was probably separated by climatic and vegetation changes at the last glacial (Hooijer, 1969), and there was probably no genetic exchange between the two extremes of that range, which now form the two subspecies,

for much longer. George *et al.* (1982), examining genetic differences in the mitochondrial DNA, estimated that the present subspecies separated two million years ago. Their sample was too small to be able to generalize, but it does indicate a considerable difference and there are obvious morphological differences. Groves (1972, 1975) described the taxonomic differences as (i) less dorsal concavity in the skull of the northern, (ii) loss of body hair in adults, and (iii) a shorter maxillary tooth row. We also observed these cranial differences in the skulls we have found (Hillman *et al.*, 1986a,b). The skull shape is distinct in the field, and the head is held higher than in southern whites. Body proportions are also different, with the northern white rhino's tending to be shorter, and there are almost certainly ecological and behavioural differences between the two subspecies.

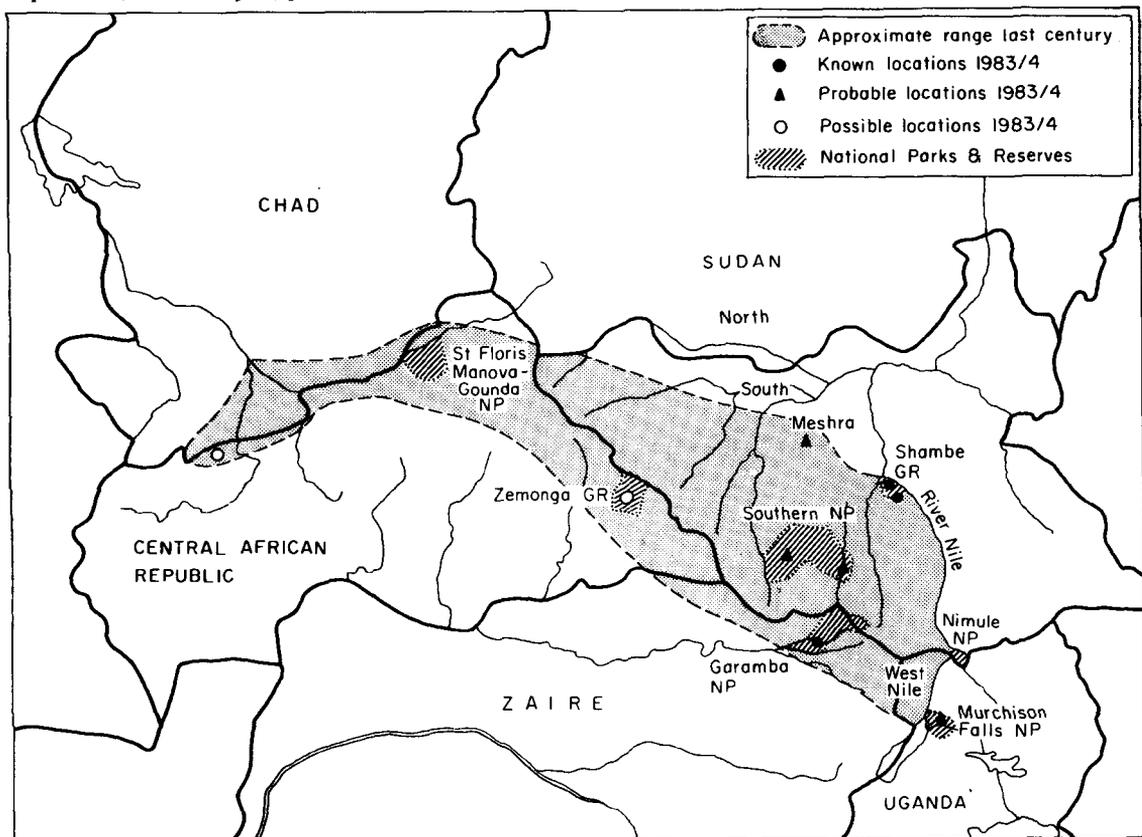
## Status of northern white rhino

The greatest difference, however, is in their conservation status. The southern white rhinos, nearly extinct at the beginning of the century, now number over 3500 and are widely distributed throughout their former range and in captivity (Hillman, 1981). The northern white rhinos face a strong possibility of extinction. A survey of African rhinos between 1979 and 1981 (Hillman, 1981) indicated a serious situation for the northern white rhinos, with low numbers and very little effective protection of them or their ecosystems. Action to improve their conservation in Sudan and Zaire was rated of highest priority by the then IUCN African Rhino Group. In 1979/80 maximum numbers were believed to be fewer than 1000, and by 1981 fewer than 700. In 1983,

a survey solely on the northern white rhinos (Hillman and Smith, 1983) revealed that numbers had dropped to probably fewer than 50 in the wild. While earlier numbers may have been somewhat overestimated, there has been a real loss of well over 80 per cent since 1979.

In Uganda, reports varied from maybe one sub-adult female left (P. Ssemwezi, pers. comm.), sightings in 1982 (I. Douglas-Hamilton, pers. comm.) to probable extinction (Edroma, 1982; F. Poppleton, pers. comm.). In 1984, the Director of National Parks requested money and expertise to translocate the one known remaining female, in Murchison Falls National Park, to another group for breeding purposes. No white rhinos are believed to remain in Chad. In the Central African Republic, where white rhinos occurred in the Zemonga region to the east in the 1960s, there have been only two recent unverified sightings reported (R. Monteyro, pers. comm.). In Sudan,

in 1979/80, 200–300 rhinos were believed to exist in the Shambe region (P. McClinton pers. comm.), and in November 1980 an aerial survey estimated  $168 \pm 71$  in the Southern National Park (Boitani, 1981). Then, they existed in a few other areas, but these have since been lost. They had already gone from Nimule National Park, which had once been famous for them. However, rhino poaching increased considerably in Sudan in 1980, and by the end of the 1981 dry season an aerial survey of the Shambe region estimated  $57 \pm 42$  rhino skeletons and  $714 \pm 243$  unidentified skeletons in 10,000 sq km, and saw no live rhinos (Hillman *et al.*, 1981). Invasions of huge numbers of well-armed poachers from the north from 1981 to 1983 probably accounted for most of the rhinos in Southern National Park. The northern white rhino ground survey in 1983 (Hillman and Smith, 1983) indicated that only a very few individuals remained in the Shambe and Southern National Park areas, possibly as many



Past and present ranges of northern white rhinos.

as 10–30 overall, but that the widespread poaching, together with civil and military unrest, now preclude conservation action.

In Zaire, the only white rhinos remaining were in Garamba National Park, a World Heritage Site, established in 1938 specifically for the protection of the rhinos and the Congo giraffe *Giraffa camelopardalis congoensis*. At that time, there were about 100 rhinos (Curry-Lindahl, 1972). Numbers increased subsequently, and between 1960 and 1963 the park staff estimated 1100–1300 rhinos. However, they fell again rapidly between 1964 and 1968 when the Park was occupied by Simba rebel forces, then Sudanese and mercenaries, who killed the rhinos to exchange the horns for money or arms. Curry-Lindahl (1972) estimated that 900–1100 rhinos died, leaving fewer than 100. After control of the Park was regained, rhino numbers increased again. In 1970, 65 were reported from a preliminary foot survey by park staff, and reported numbers varied in subsequent years (Hillman *et al.*, 1983), probably due to different methods of estimation. In 1976, an aerial sample count estimated  $490 \pm 270$  (Savidge *et al.*, 1976). Poaching apparently began again in earnest between 1978 and 1980 with the ready availability of arms from Uganda and Sudan and a disinterested Conservateur, and by the end of the 1981 season only 35 rhinos were seen by park staff on a foot survey south of the Garamba River.

### **The rhinos of Garamba: a conservation priority**

A joint meeting of the IUCN African Rhino Group and the IUCN African Elephant Group in August 1981 gave highest priority to conservation of the rhinos in Garamba National Park, which, as an existing park, appeared to have greater chances of conservation success than Sudan. In 1982, an FAO project stimulated further alarm on the deteriorating situation for the rhinos in Garamba. As a result, the newly amalgamated IUCN African Elephant and Rhino Group, with the World Wildlife Fund (WWF), sent a mission to the Park, which formulated an updated and larger project with the authorities for preliminary, immediate action. The Zaire part of the 1983 survey of the status of northern white rhinos (Hillman and

Smith, 1983; Hillman *et al.*, 1983) consisted of a series of aerial and ground surveys in Garamba National Park, funded by WWF, the Global Environment Monitoring System of the United Nations Environment Programme (UNEP), and helped by the Frankfurt Zoological Society (FZS). These comprised: an intensive 46 per cent systematic sample count over the southern third of the Park, where rhinos could most be expected (1609 sq km); a general 10 per cent systematic sample count over the whole Park (4900 sq km) and a major part of the surrounding hunting reserves (total 8998 sq km); a ground count by park staff walking 2-km-spaced transects, and a simultaneous very high intensity ground and aerial count over 84 sq km of the main rhino area. Results from these, together with general reconnaissance flying and walking, and with the information on known individuals from guards, led to an estimate of 13–20 rhinos remaining in the southern part of the Park and little likelihood of any in the north.

A recommendation by some members of the African Elephant and Rhino Specialist Group that the rhinos be translocated was unacceptable to the Zaire authorities. However, because of it, the new IUCN/WWF/FZS/UNESCO project to rehabilitate Garamba National Park did not initially incorporate any special measures for the rhinos. The rehabilitation project was not able to start until March 1984 and became effective only in August. Between the survey in March 1983 and August 1984, four or five rhinos were reported to have been poached. With the start of the rehabilitation project, one of us (KH), with help from the Fauna and Flora Preservation Society (FFPS), Kenya Rhino Action Group (KRAG) and WWF, has been, with MmO, trying to ascertain rhino numbers and population structure through individual recognition, while also examining other possibilities for improving their chances of survival. At the same time, we are establishing a monitoring programme for the wildlife with emphasis on the rhinos. Eleven individuals could be accounted for by June 1984 when increasing grass length made ground work ineffective. Since then, we have found another two adults and a female and calf north of the river, and in March 1985 a new young calf was observed. We cannot be sure of numbers yet,

since from the air one cannot always identify individuals, but ground work is underway again. However, we can so far account for between 13 and 15, and it is very likely that more exist. These individuals are listed in Table 1.

### Poaching perhaps controllable

With the changing of Conservateurs from those in the main poaching years, and the input of the resources and manpower of the rehabilitation project, there is at last a chance that an anti-poaching drive can be made effective. The limited action possible over the past two years has certainly improved matters; no fresh carcasses have been found and gunshots have not been heard south of the river. The rehabilitation project is now including some emphasis on the rhinos in its anti-poaching efforts, and it is felt that the population should be closely monitored. However, it is also felt that further specific action for the rhinos is needed, both in the intermediate and long term. The line of action must, however, ultimately be decided by the Zaire authorities.

In Garamba National Park, the level of poaching at present is not as severe as it has been, or as in some other African countries. It would seem to be potentially controllable, at least in the south. A recent rhino poacher obtained a very low price for horn, indicating some lack of sophistication in the

Table 1. Northern white rhinos known in Garamba National Park (March 1985)

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4 or 5 adult males
5 adult females
1 unsexed subadult
1 male calf, more than 1 year old
1 female calf, 1 year–18 months old
1 unsexed calf, less than 1 year old
1 unsexed calf, born about February 1985

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system. We have evidence that horn from Zaire has been traded through Sudan. The main aim of the poaching is to make money by selling it on the illegal international market, but there are also a few local uses of rhino products in northern Zaire: small pieces of horn are sometimes fashioned into rings to protect the wearer against poisons or harm from another person.

### Captive rhinos

There were 13 northern white rhinos known in captivity at the beginning of 1984. It would appear that more have been caught from the wild in the past, but their current whereabouts are not known. Those known are listed in Table 2.

The group at Dvur Kralove are breeding and are being managed to improve reproductive success (with hormone treatment) and to maximize genetic variability (by changing the males given access to the females). From the summer of 1984,



A view of the Garamba River (Kes Hillman-Smith).

Northern white rhino

they were to have had a larger, semi-natural area (J. Safarik, pers. comm.). It is important for the survival of the subspecies that a strong captive population is built up as a back-up to a wild one. When feasible, it would be advisable for a second group to be established in a different location, but with exchange of genetic material. It could be possible to do this with one male and two females if a male southern white rhino were kept in an adjacent enclosure to provide the group stimulus necessary for breeding success as recommended by Lindemann (1981). The male at Khartoum is young enough to be able to make a valuable contribution and should be loaned to join others if possible. Any advances in the field of reproductive management, such as artificial insemination of white rhinos, *in vitro* fertilization and/or transfer of northern white embryos to southern whites, would be most valuable. Correspondence with experts in this field indicates that it is not beyond the bounds of possibility.

## Future possibilities

What are the chances of a future for northern white rhinos? They appear to be slim, but possible with enough long-term input. In view of the low numbers, it is necessary to make a two-pronged approach, both by improving and consolidating the captives and also by protecting the last major wild group and their habitat. Management of the captive rhinos could include the following:

(i) Examination of the existing captive-breeding group to ascertain if there are ways in which their breeding or husbandry could be further improved and whether international help would be needed.

(ii) Formalizing of agreements on exchanges of animals or genetic materials to maximize heterozygosity. The zoos holding the rhinos agreed to this informally in 1982.

(iii) Loan of the male from Khartoum Zoo to a breeding group, and possibly the use of the San Diego male, in a suitable situation.

(iv) Development of techniques, such as artificial insemination and embryo transplant, applicable to white rhinos. Southern white females would appear to be a suitable recipient for the latter.

(v) Establishment of another breeding group, as the IUCN Captive Breeding Group recommends for the management of endangered species. It could be feasible to establish another group somewhere using the male from Khartoum, the female from Uganda, and loan from Dvur Kralove and, at a later stage, perhaps a few from Sudan, if all parties were agreeable. All animals would need to be held on loan, and breeding exchanges should be considered an integral part of the operation.

As far as the wild rhino population in Garamba is concerned, it would theoretically be possible for their numbers to build up again from the present low level. Recent tests on genetic variability in

Table 2. Northern white rhinos in captivity

Studbook no.	Sex	Date and place of birth	Location held	Date of arrival
16	f	1948 Sudan	Antwerp	7.7.1950
19	m	1950 Sudan	London	25.7.1955
74	m	1952 Sudan	San Diego	2.8.1972
347 or 348	m	? Sudan	Khartoum	4.1970 or 3.1973
372	m	1973 Sudan	Dvur Kralove	13.10.1975
373	m	1972 Sudan	"	"
374	f	1974 Sudan	"	"
376	f	1972 Sudan	"	"
377	f	1972 Sudan	"	"
378	f	1969 Uganda	"	27.8.1977
476*	f	11.11.77 Dvur Kralove	"	11.11.1977
630	m	8.6.83 "	"	8.6.1980
	f	15.11.83 "	"	15.11.1983

\*May be of mixed *C.s. simum* and *C.s. cottoni* parentage.



Adult male northern white rhino (Kes Hillman-Smith).

small populations indicate that there is less cause for alarm about loss of heterozygosity and genetic viability than was previously believed (D.S. Woodruff, pers. comm.), especially if the population does not remain small for many generations. There are many examples of species having rebuilt numbers from very low levels. The southern white rhino is a classic example. Six black rhinos introduced into Akagera National Park, Rwanda, in 1958 bred to result in a population of 20–40 by 1979 (N. Monfort, pers. comm.). Eight Himalayan tahr were introduced into New Zealand; now they are a national pest (M. Gwynne, pers. comm.). The total world population of Père David's deer, of several hundred animals, originated from three individuals at the beginning of this century (D.S. Woodruff, pers. comm.).

If one were to assume a present population of 15 rhinos in Garamba, even at a pessimistic rate of  
*Northern white rhino*

increase with a 10 per cent natural mortality each year, they could more than double in 10 years. Owen-Smith (1974) found a maximum 10 per cent rate of increase in a population of southern white rhinos at a high density, and where one might, perhaps, expect some degree of feedback to depress breeding rate. Heller (1913) observed that northern white rhinos then in Sudan began breeding at an earlier age than southern whites. A 10 per cent rate of increase in the Garamba population would give more than 40 animals in 10 years. If the ecosystem were sufficiently safe in the future, captive animals could also be reintroduced.

However, all such theoretical possibilities are meaningless unless the population can be protected against poachers. It is, therefore, vital that there is rapid, sufficient and long-term input to give them adequate protection, and that there is a national, as well as international, commitment to it. Although general improvements in anti-poaching moves are now underway, rhinos are not given priority.

There are two other opportunities for conservation action. Firstly, it has been suggested that the Garamba rhino population should be translocated to another country. This is, understandably, unacceptable to the Zairois. Even if it were acceptable, there would be immense practical difficulties and a need for massive funds, which might be better spent on protecting the rhinos *in situ*. The translocation exercise would also involve danger for the rhinos and would render the subspecies effectively extinct in the wild, while the theoretical aim of later reintroduction would not only be extremely far in the future, but fraught with even greater difficulties (Stanley-Price, 1985). Secondly, proposals have also been made to hold the rhinos in captivity or in semi-captivity in the Park, or elsewhere in Zaire. This option has considerable practical disadvantages in a place like Garamba, and would also involve danger for the rhinos and a good deal of expense, but is not inconceivable. We favour the concentration of special efforts to protect and maintain the rhinos in the Park, in conjunction with the rehabilitation project. It is five years since northern white rhinos were accorded higher conservation priority than any



Adult male northern white rhino in Garamba National Park (Kes Hillman-Smith).

other rhinos in Africa, yet very little concrete has been achieved for them. We believe it is worth making an effort to save this last remaining wild population.

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- Dr Kes Hillman-Smith and Dr Fraser Smith, IUCN/Parc National de la Garamba, c/o AIM/MAF (via Bunia, Zaire), Box 21285, Nairobi, Kenya.*
- Dr Mankoto ma Oyisenzo, Institut Zairois pour la Conservation de la Nature, BP 868, Kinshasa 1, Zaire.*

#### Postscript

Since this article was submitted, two more rhino calves have been born at the Park.