SURVEY OF THE STATUS

OF

THE NORTHERN WHITE RHINO

(Ceratotherium simum cottoni, Lydekker)

IN 1983

Kes Hillman & Fraser Smith

"The black rhino is still very plentiful throughout a large tract of country along the southern bank of the central Zambesi, as it doubtless is also in many parts of the interior of Africa, and it will be many years, perhaps centuries before it is altogether exterminated; whilst its congener, the large, white grass-eating rhino, whose range was always much more limited as it was entirely confined to those parts of ..... Africa where were to be found the open grassy tracts necessary to its existence, is upon the verge of extinction....."

F.C.Selous (1893)
Travel and Adventure in South east Africa.

CONTENTS

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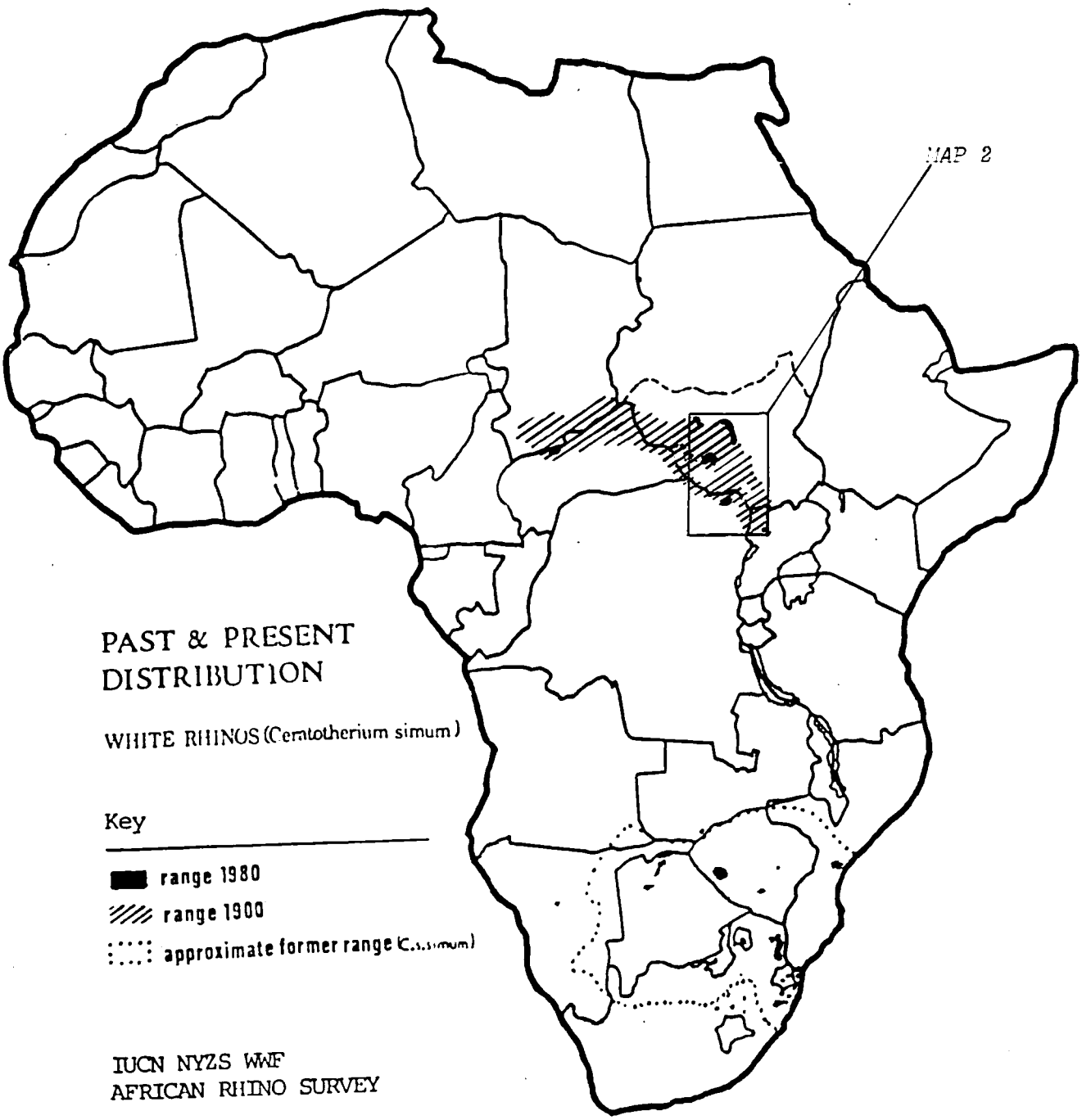
INTRODUCTION

THE RHINOS

The White Rhinos of Africa (*Ceratotherium simum*, Burchell) are separated geographically and morphologically into two sub-species: the northern form (*C.s.cottoni*, Lydekker) and the southern form (*C.s. simum*, Burchell). At the present time there is also an extreme difference in their conservation status, although since the beginning of this century, this has shown a reversal in balance. At that time the southern sub-species had been hunted almost to extinction. In fact Nicolls and Eglington wrote, in 1892, that there was every reason to suppose that it was extinct. Between 1874 and 1879, Selous observed that they went from "fairly plentiful" along the Chobe river, to no signs at all and reports of being "finished". At the turn of the century the only ones known were in the area that is now Umfolozi Game Reserve in South Africa. (Sydney, 1965). One report (Renshaw, 1904, in Sydney opp.cit.) put them as low as 10, but that may have been pessimistic. Hobley in 1926 estimated 20 in Zululand. However, with creation of the Game Reserve and improved protection, their numbers increased, until in the 1960s, a programme was started for their capture and translocation to conserve the habitat and to re-distribute them throughout their former range. Now there are over 3,500, in Umfolozi/Hluhluwe Game Reserve, in other Parks and Reserves and on private land in southern Africa and in zoos world-wide. (Hillman 1981)

The existence of the northern whites was only confirmed at the beginning of this century, when Sclater exhibited the anterior horn of a white rhino shot near Lado on the White Nile, by Major Gibbons. (Sydney opp.cit.). Lydekker described the sub-species in 1908 from a skull brought back by Powell-Cotton. Then they were fairly numerous and their range was believed to extend from West Nile Province in north west Uganda, up the west bank of the White Nile to Shambe (above which is a major river that could have been a geographical barrier). It then went north west through Bahr el Ghazal, past Gogrial and Aweil into Central African Republic and Tchad (Sydney opp.cit.) In the latter they were apparentely found near Goz Beida (Harper 1945) and the British Museum has horns from the region of Lake Tchad. They apparentely occured down the Sudan border of CAR and into northern Zaire (then Belgian Congo), where they were found in the Uele region, and occurred from Doruma to Aba and the Uganda border, including the area of the now Garamba National Park. They must also have occurred in places throughout the part of southern Sudan between these areas, since they are, or were until recently, still there. They have been counted in Southern National Park and were reported by hunters from localities close to the CAR border. Throughout the range they were only found in certain places, probably associated with suitable habitat, of grassland/woodland interface and available water.

Within recorded history there have been no white rhinos between the south eastern limit of the northern race, at the Nile in the east and Wadelai in the south, and the northern limits of the southern race, the Zambezi river, a distance of some 2,000km. There are fossil records of a white rhino ancestor in the beds at Lake Turkana in Kenya and there is a cave painting of a white rhino at Kisese in Southern Tanzania, estimated to be about 34,000 years old (though movements of people are such that they could have seen it elsewhere). There is no doubt that the two present sub-species, which must themselves have represented opposite ends of a continuum at one time, have been separated for a long time, though how long is not certain. It would seem reasonable to link a break with vegetation changes associated with the last glacial. Ryder at al (1982) working on mitochondrial DNA showed that his samples of the two present sub-species differed by 4% and differed from black rhinos (*Diceros bicornis*,L) by 7%. This indicates that the whites


MAP 2
PAST & PRESENT
DISTRIBUTION
WHITE RHINOS (Ceratotherium simum)
Key
range 1980
range 1900
approximate former range (C. simum)
IUCN NYZS WWF
AFRICAN RHINO SURVEY
MAP 1

shared a common ancestor 2 million years ago and the blacks and whites 3.5 million years ago. However the sample was from only one animal, and more samples and different methods would also be needed before dates could be accepted with certainty. But it does indicate a considerable difference, and there are obvious morphological differences between the two. The northern white rhino looks to most people like a cross between a black rhino and a southern white. Groves (1972) describes the differences as : less dorsal concavity in the skull of the northern , loss of body hair in adults and a shorter maxillary tooth row. The animals appear smaller, and those in Garamba, though it may be due to environmental or individual differences, have extremely hairy ears. What ecological differences there are remain to be found. Van Gyseghem, in Murchison Falls National Park, found a basically similar social organisation to that of southern whites, on a small sample. But neither he nor Pierret at al(1976) found proof of territoriality, while they did find considerable movements.

In particular, at present there is an enormous difference in conservation status of the two sub-species. While the southern whites are numerically secure and widely distributed, the northern white are down to very low numbers in relict populations. They are the only representatives of the species in Africa north of the Zambezi, and they represent areas and ecosystems, greatly in need of conservation action.

Initially they were hunted by sportsmen. Virtually all the populations have suffered the effects of guerrilla warfare and the loss of law and order in countries at war. In recent years, they have become the victims of those out to make money from the horn.

By 1979/80 their occurence was far more limited than at the beginning of the century. None were believed to remain in West Nile and the only possible survivors in Uganda were doubtfully reported in Murchison Falls National Park, where 12 had been translocated in 1961 and 4 . They had gone from most of the West bank of the Nile except in the Shambe region and the area immediately south of it (Alliab Dinka region). In the Shambe area, McClinton (pers. comm.) estimated 2-300, and they were certainly quite frequently seen from the air. (own observations). There were doubtful reports of their existence in the Meshra area near Tonj (Henry Minga pers.comm.) and hunters reported a few towards the CAR border (A.Dacey pers. comm.). Watson's low intensity aerial census in 1976 had estimated 203 in Western Equatoria (Watson et al 1976). In 1980, a count carried out under the auspices of the University of Rome estimated 168 ± 42% in Southern National Park (Boitani 1981), but it was also reported that they had gone from Chelkou and Numatina Game Reserves (W/L.Dept. Southern Region). (Hillman 1981)

In 1969-70, Corfield and Hamilton (1970) had failed to find any evidence of the existence of them in eastern CAR, nor have hunters reported them since. Since then, however (during this survey, R.Monteyro pers.comm.) we have received reports of them at Golongossa in western CAR. It is believed they are extinct from Tchad.

In Zaire, the only place where they remained for sure was Garamba National Park (Hillman & Grimwood 1980). That is the only population in a functional National Park, since resources in Sudan are so inadequate that Southern National Park is impossibly under equiped and staffed.

REASONS FOR THIS SURVEY

In view of both their status and the conservation needs in the ecosystems where they occur, the IUCN African Rhino Group gave projects for their conservation highest priority following the IUCN/NYZS/WWF Survey of the status of rhinos in Africa (Hillman 1979-81). Two projects were developed in conjunction with and at the request of the governments involved. These were, the establishment and development of a National Park in the region of Shambe Game Reserve in Sudan, and aid to re-developing the conservation capabilities of Garamba National Park. The other main area where they

occurred in Sudan - Southern National Park, was being surveyed for a major development plan by the Government of Italy and therefore it was felt that no extra help was required.

However it took time to get the projects funded and in action. Meanwhile, the rhinos were being poached. By the time an IUCN aerial survey of the Shambe area was able to be carried out to make specific recommendations for the establishment of the Park, no live rhinos were to be seen from the air, only carcasses. (Hillman et al 1981) Aerial counts are notorious for missing low density species like rhinos, and subsequently there were a number of reports of sightings of rhinos and tracks by informers on the ground (C. Acire , letter). The situation in Garamba National Park was uncertain.

Therefore, when approval for spending some funds on the northern white rhinos was confirmed, and the new IUCN African Rhino and Elephant Specialist Group under the Chairmanship of Dr D. Western decided to push for action in this field, the first thing to be done was a detailed survey to find out what was left and what could best be done for their conservation. Hence the survey reported here.

OBJECTIVES AND APPROACH

The objective of the survey was:

To find out as far as possible in a few months, the current status of the northen white rhinos, with emphasis on the priority areas; and to assess what could most effectively be done for their conservation.

Top priority for the IUCN/AERSG was Garamba National Park. Second priority was Shambe and other areas of Sudan. The survey had to be carried out urgently and in a short time to fit into a dry season (January to April). The main approach in Garamba National Park was an aerial survey to be done in March at the same time as the Park ground count. Aerial surveys had already been carried out in the Shambe area and Southern National Park in Sudan.(Hillman et al 1981, Boitani 1981). The first approach in Sudan was therefore to be ground work in conjunction with the Wildlife Department of the southern region and their informers who were reporting rhino sightings. Aerial work was to be used complementary to this when the most cost effective needs for its use had been identified . Aircraft it was hoped to use for simple exploratory recce flying were those which would already be in Sudan - a) of Phil Snyder, Frankfurt Zoological Society project officer in Boma National Park, b) of Peter McClinton, FZS project officer in Juba or c) of Dr Steven Cobb who was to be doing aerial work for UNDP in the area. If a major survey was required; Frankfurt Zoological Society had kindly offered help from Dr Markus Borner and his FZS aircraft from Tanzania. Dr Borner and this aircraft flew the aerial survey in Garamba National Park, which is reported in a separate annex.

The survey was carried out mainly by the authors, Kes Hillman and Fraser Smith. In Sudan we worked in conjunction with the Wildlife Dept. of the Southern Region, in particular with Gabriel Gurguri, Senior Wildlife Inspector, Yirol and with Simon Maswa of Maridi and Girardo Wol, Senior Wildlife Inspector, Tonj, and in the latter stages, with help from assistant Tim Wood. In Garamba, the major part was aerial work done with Dr Markus Borner of FZS, Mankoto ma Oyisenzoo of the Institut Zairois pour la Conservation de la Nature (IZCN) and Dr Pat Rogers of FAO.

AREAS OF INTEREST

On the basis of previous work and reports and subsequent developments, the following areas were , in order of importance, the main areas of interest for the survey:

Zaire

1.*Garamba National Park.*
Intensive and broad based aerial and ground counts were carried out in March and are reported in detail in a separate annex: *Aerial Census of the Garamba National Park in Zaire, March 1983, with emphasis on the Northern White Rhinos and Elephants; (1983) Kes Hillman, Markus Borner, Mankoto ma Oyisenzoo, Patrick Rogers, Fraser Smith.*

Sudan

2.*Shambe and adjacent areas.*
The Shambe area had highest priority in Sudan in the past and was therefore the first area to be visited. It included the Alliab Dinka area to the south, where rhinos had also been reported by hunters,and was covered in Februar

3.*Southern National Park*
This is an area of 16,640 km^2 with virtually no access roads. It was hoped that we could do intensive aerial survey of the main area where rhinos had been seen on the 1980 count and some ground work. However, the western part of Southern Sudan had been overrun by poachers for the previous two seasons and it was reported that they completely occupied the Southern National Park this season. They were heavilly armed and backed and there was therefore not much hope for the remaining rhinos there. Nor was it possible to find an aircraft that the owners were prepared to risk on a low level intensive survey over such armament, until the end of the dry season, when the poachers began moving out. Permission was then obtained for the FZS aircraft with Markus Borner. However he was indisposed at the first possibility, and by the second, Southern Sudan had broken out in virtual war and it became impossible. Limited ground work in the eastern side of the Park, following up reports of rhinos was however carried out in April.

4.*Lantoto Proposed National Park.*
This area borders Garamba National Park in Zaire, and the southern part was surveyed during the aerial survey of Garamba. Results are reported in the annex.

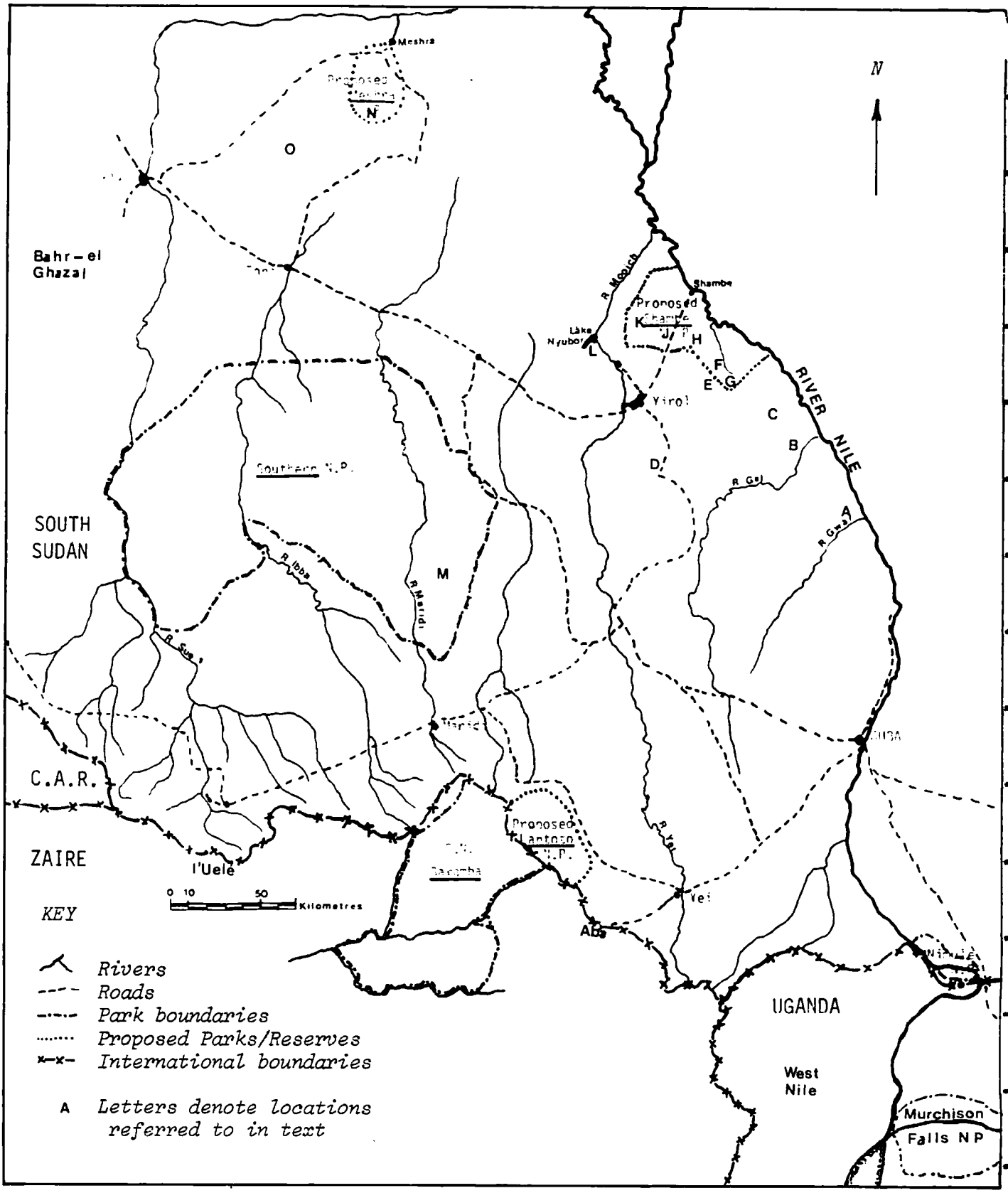
5.*Meshra proposed Game Reserve and Tonj area.*
Reports from this area were rather limited and variable and none more recent than 1980. We tried to arrange brief aerial reconnaissance of the area, but aircraft were continually unavailable, and permissions for flights are difficult to arrange for outside aircraft. Ground work was carried out in April.

Other areas

Uganda and Central African Republic.;
Although not directly surveyed, information was collected on the existence of northern white rhinos in Murchison Falls National Park and in C.A.R. One flight was made over the area where the rhino was believed to occur in Murchison Falls.

Captive rhinos

Although it was not directly part of the survey, some information is presented and discussed on the northern white rhinos in capitivity, since this is of relevance to the survival of the species. The only breeding group at Dvur Kralove in Czechoslovakia has been visited by one of the authors.



MAP 2

AREAS COVERED IN THE SURVEY , IN SUDAN AND ZAIRE AND UGANDA

METHODS

ITINERARY

January - 1983 Preparation of vehicle and equipment and arranging logistics in Nairobi.
Drive up through Kenya to Juba, Southern Sudan
Information gathering, talks and planning
Southern Region, hunters and others. Arrangements of fuel etc and attempted arrangements of aircraft.

February - Ground survey in Alliab Dinka and Shambe areas. Interim report.

March - Aerial survey and some ground work, Garamba National Park.
Return to Nairobi.

April - Writing Interim Report to IUCN/AERSG and IUCN and article.
Vehicle repairs and arrangements for return.
Drive through Uganda to Juba.
Ground work in eastern Southern National Park.
Ground work in Tonj/Meshra area.

May - Garamba National Park, initial work on reports, transport of equipment for conservation project, meetings and information collection, with IZCN.
Return to Nairobi via Uganda.
Some analysis.
Attempted aerial work in Southern National Park foiled by war.

June - Analysis, discussions, proposals.
Series of meetings with representatives of IZCN and FAO.

July/August - Analysis, writing up and project proposals.

Other relevant work:

August 1982 - Presentation of a paper, and discussions at Rhino Captive Breeding Symposium, London.
Visit to Vychodeceska Zoo,Dvur Kralove for the only captive breeding group of northern white rhinos.

October/November - Emergency mision to Garamba National Park and Kinshasa preliminary information collection and negotiations there and in Sudan. Reports and project proposals.

AERIAL WORK

Systematic sample counts at 46% and 10% intensity and a small'total'count in Garamba National Park and environs. Details of methods are given in the report of the census of Garamba National Park.

GROUND WORK

a) Information was gathered from reports, from talking with members of the Ministry of Wildlife and Tourism,game scouts,hunters, trackers, local people particularly Wildlife Department 'informers' and any researchers or others who were familiar with certain areas. It was interpreted with some assessment of credibility on the basis of time spent in the field, amount and accuracy of detail, motivation etc.

b) Reports of sightings by informers were followed up by going to the areas with the informers and looking for signs and at habitat etc.

c) Criteria for deciding on areas to be investigated were based on local knowledge and reports, information on habitat preferences together with vegetation maps and aerial knowledge. Broad vegetation classifications were made based on the Yangambi Classification of Vegetation Types for

Tropical and Sub-tropical Africa. Collections were also made of the dominant plants. Dry season water points were a prime focus of attention.

d) A 'density-index'system was devised to try to get relative ideas of density of rhinos in the different areas. This involved walking or driving 'transects' through areas suspected to have rhinos, to record:

All possible signs of rhinos ie dung, spoor, scrapes,rubs etc.

All sightings of rhinos, classified into sex and approximate age, and with individual characters recorded, to know if the same ones were seen again.

All sightings of other species of live animals to obtain an indication of relative value of the area for wildlife as a whole.

Transects were not straight line, since signs were so few, but concentrated on tracks and waterholes and other places where rhino signs could most be expected. Distances travelled were measured by a K+R Pedometer, walking and the vehicle odometer, driving. The same method was used throughout Sudan and also in areas of known rhino density, in Garamba and in Pilanesberg Game Reserve, in order to calibrate it.

e) All waterholes were inspected for spoor and time was spent watching likely waterholes and recording species visiting.

f) Most areas were covered in conjunction with either the local wildlife Dept. officers and their scouts and informers, or with hunters who knew the particular areas well.

Vegetation classifications used were as follows: (based on the Yangambi System, Scientific Council etc 1956)

WS	Woodland savanna
TS	Treessavanna
TBS	Tree/bush savanna
BCS	Bush clump savanna
GS	Grassland savanna

Densities were measured as:

O	Open (every 70-30 metres)
M	Moderate (every 30-7 metres)
D	Dense (every 7-3 metres)

RESULTS AND DISCUSSIONS

1. ZAIRE - GARAMBA NATIONAL PARK

The population estimate of rhinos from the census was 13-20 individuals, south of the Garamba River. Seventeen different individuals could be accounted for from known animals and sightings during March. As an existing National Park, with a well-established, though presently run-down infrastructure, it stands the best chance of enabling conservation of a wild population of northern white rhinos and their ecosystem, if international aid is given. Details of the count are presented and discussed in the separate report cited previously.

2. SUDAN - SHAMBE REGION

In the Shambe region, including Alliab Dinka, a total of 564 km were driven and 89 km walked searching for signs of rhinos in areas where they were to be expected. Twenty seven hours were spent at waterholes, with a further 3 nights spoor checked in the mornings, and all the main waterholes known to the informers were checked for spoor.

Results of the 'density-index' approach and reports received are given below for each area separately. Sightings of other species per unit distance walked or driven are given in the Appendix I. Letters denoting areas are marked an Map 2.

Alliab Dinka

Information for this area was provided by very experienced hunters and their trackers of Nile Safaris, and by the Game Scout attached to them and local Dinka met en route.

Reports

Prior to going to the area we had received a report of 3 different rhinos having been seen there in the previous season. Subsequently it appeared that these had been seen the season before.

All reports in the area indicated that the rhinos had been fairly plentiful up to 2 or 3 years previously, particularly along the Waat, Gwar and Gel rivers, which are virtually the only sources of water in the dry season, apart from the Nile itself. Poaching there appeared to have started 3 years previously, and in a very thorough coverage of the whole area throughout the whole previous season, the hunter, who has known the area for 20 years, could find no signs of rhinos. A Dinka that we met along the Waat river reported that Dinkas had occasionally killed them with dogs and spears, and that game department scouts had shot them with rifles.

Signs of rhinos

	Location	Habitat	Driven/Walked	Rhino signs
A	Gwar river	TBS	8km//	-
B	Waat & Gel rivers	Acacia TBS BCS & TBS	91km /	-
B	Waat river & tooich grassland	TBS GS	80km /	-
AB	Gwar area & Waat river	WS TBS	110km /	-

C This area of tooich grassland, woodland interface was not visited by us, the hunter's reports of his coverage of it the previous season are the same as those for the above areas.

D Rhino signs had previously been known from the Akeu area, but found no signs for the previous 2 seasons.

Shambe Proposed National Park and immediate environs

Information for this area was provided by Gabriel Gurguri, Senior Wildlife Inspector, Yirol, his Game Scouts, 'informers', who were generally local honey hunters, who knew the bush, and who provided information and help to the Wildlife Dept. in return for pay, local people we met in villages etc. , hunters Manuel Silva and Tony Sanchez of Nile Safaris and their staff, an anthropologist working with the Dinka and our own previous work in the region. Informers used were: Achiek Apwot (locations E-G), Awel Akey (H,J) Deng (G), Achol Korum (K).

Reports

Subsequent to the aerial count in 1981, the Senior Inspector had reported (letter from C.Acire, 1981) sightings of 24 rhinos in 4 different locations. On investigation it appears that these were mainly reports of spoor or other signs.

The recent reports that Gurguri had on file were:

18.11.81 - 4 live rhino in forest near Yom Aliar village and Ramciel (G)

29.10.81 - 1 rhino at Nuai
Rhino attacked cattle camp at Matar
12 rhinos reported to be seen near Karer (J,H)

13.1.83 - Tracks of 2 rhinos at Lerwot (F)
3 rhinos at Yuekket
Rhinos exist at Alel

He also had the following reports of poaching:

18.11.81 - 2 elephants poached near Atorok and Awan.

17.1.83 - Soldiers were reported to have killed 1 elephant near Shambe

11.1.83 - Soldiers stationed at Shambe killed
3 giraffes (6.1.83)
1 giraffe (10.1.83)
2 lelwels hartebeest
3 hippos were wounded and escaped

21.1.83 - An elephant causing problems in a cattle camp at Amolmith near Shambe was shot with 16 rounds of a G 3 but only wounded.

It would appear that every time soldiers have been posted near Shambe during 1982 and 1983, much wildlife has been killed. They feel that they need the meat supplies, although ivory has also been recovered. In general, the Wildlife Dept. staff are so under-equipped that anyone who has arms and a vehicle could easily be tempted to poach. The army has status and power.

While surveying the Ujur area we followed wheel tracks of a lorry that led past a shot giraffe.

The main rhino poaching in the area was 1979,80 and 81 (this has also been confirmed by informers and by own observations) and at that time much of it was promoted by two policemen who hired people to do the poaching. However nothing could be proved against them.

The Lake Nyubor area (L) was not directly surveyed by us, but is thoroughly covered by hunting safaris in the dry season. Rhinos used to be present there, but hunters report that they have seen no signs of live ones this or last season. Three rhino skeletons have been found along the swamps there (Silva pers, comm.) and one was brought back to be measured.

Dinka reported to us and to the anthropologist that there were rhinos north of that area, though others also reported that they had gone.
The anthropologist was however offered rhino horn that was fresh and must have come from a rhino killed at the end of 1982.

There was an unconfirmed reprt of a rhino having been killed by Nuer along

the river Mooich in April, when we returned through Yirol in April. (Gurguri pers.comm.)

Signs of rhinos

We followed up all the reports of rhinos having been seen in particular areas by going to those places with informers and Gurguri, and searching for signs:

Locations	*Reports*	Habitat	Driven/Walked	Rhino signs
E Amereichir	-*Sightings 1981 (Acire, letter)* -*Recent signs & saw live rhinos x3 in July 1982 fairly near, but where there is now no water. (Achiek)*	TBS - M WS	55km/1km	- Faint possibility of 2 tracks of rhinos some days old, but they were almost certainly a combination of tracks of giraffe & buffalo They would have measured 20x27.5 cm which is also too oblong for white rhino.
F Lerwot forest	-*Used to be rhinos here at this season (Achiek)* -*Game scouts saw rhino at Lankara Pool Aug.1981*	WS - M GS Nearest water- Bei river.	32km/11km	- Faint possibility of 2 tracks from wet season in old mud, 1 at Lankara pool; uncertain. - Parts of a track shown by informer, but more likely combinations of spoor of other species. - 1 piece of dung suggested as rhino by informer, but very small and unconvincing. - Scrapes shown by informer as horn scrapes, but could be warthog diggings.
F Bei river near Lerwot	-*Rhinos should drink here from Lerwot (Achiek)*	GS Water	/4.6km	- No rhino spoor coming to drink. One set of spoor shown by informer as rhino were clearly hippo.
F Forest inland from Lerwot	-*Live male & female rhinos seen here late 1982.* -*Scrape & fresh spoor Jan.1983 (Achiek)*	WS - M/D	/3.2km	- Old possible scrape marks - 2 possible tracks from wet season 25x25cm No confirmed or fresh spoor. - 1 rhino skeleton, young adult; ⩾ 2 years since death.
G Katial Pool & woodland	-*Rhinos seen nr. Yom Aliar 1981* -*Villager reports fresh signs at pool.*	WS - M/D GS Water ltd. to small muddy pool	60km/10.2km	- No confirmed signs
H Ujur to Katiang Pool	-*Previous high density area (Chipperfield caught here)* -*Rhino seen Ujur Oct.1981* -*Tracks just N.E. Sept.1981*	WS - O TBS- O GS Water at pool but also people	/23.8km	- 3 trees with mud rubs at rhino shoulder height - 1 rhino skeleton, adult ⩾ 2years since death - 2 suggested horn scrapes, but warthog diggings nearby - 1 rhino skeleton (no skull) with 2 giraffe skeletons

Location	*Reports*	Habitat	Driven/Walked	Rhino signs
H cont'd	*-Gurguri & Awel saw no signs in 1981 but collected 2 skulls nr.Karer*			-Faintly possible old spoor -Faintly possible, but unlikely old dung & scrape
J Karer-Jor-Pakeng	*-Previous high density area (Awel)*	TBS-O GS	20km/2km	-1 possible skeleton (no skull) -1 possible rhino bone -No signs of live rhinos. -1 skull nr rd.by Karer adult, ± 4yrs since death
K Pagarau-Warjak Pool-Nyrcircik Pool	*-5 live rhinos reported seen 8.2.83 (report later found to be almost certainly false) (Game Scout,Tiop & Achol)* *-4 rhinos seen, May/June 1981 (Achol)* *-1 rhino also*	TBS-M TS -O Water at both pools	70km/4.2km	-Very credible rhino spoor in dry mud from wet season, 25x23cm -Very credible dung by Nyrcircik Pool (few weeks old)
K Nyrcircik-Tiengau	*reported to be in forest at*	TBS-M	35km/	-
K Warjak Pool -Pagarau & return	*Manyang*	TBS-M	/38km	-

Pool watches-Locations	Time	Rhinos or signs
K Nyrcircik Pool	10.00-15.30 Evening & night watch foiled by Anyanya II guerillas	-
K Warjak Pool	17.30-19.30 06.30-19.00 06.30-19.00 3 nights spoor checked	- - - -

L Lake Nyubor/River Lau — Nile Safaris have intensively covered the area for a number of seasons. For the past 2 they have seen no signs of rhinos, but found 3 skeletons.

Likely signs of rhinos were too few to make the density-index method really meaningful. However, the following summarises the signs found per 10km walked :

(Unlikely rhino spoor	2.1)
(Unlikely dung	0.2)
(Unlikely scrapes	0.2)
Likely rhino spoor	0.2
Likely dung	0.2
Likely scrape	0.2
Rhino skeletons	0.9
Rhino sightings	0

This can be compared in the discussion with indices from other areas.

Dead rhino

Three rhino skeletons with skulls were found by us, and one definite and one other possible rhino skeleton without skull. Two other skulls were brought in by others and all 5 skulls were measured.

All showed signs of poaching, with cut marks on horn bases and a bullet hole.

All were estimated to be 2-4 years since death:

1 @	4 yrs	(Karere)
2 @	3 yrs	(Ujur,Jor)
4 @	2 yrs	(Lerwot, Ujur,L.Nyubor)

(Estimates based on similar estimates and records for elephant skeletons of known age, Douglas-Hamilton & Hillman 1981, but rates of decay may vary under these extreme conditions of heat and rainfall.)

Measurements, where they could be made are as follows:

No.	Date found	Location	Age S.D.	Dorsal Length (cm)	Ventral Length (cm)	Dorsal Concavity (cm)	Maxill'y Length (cm)	Age * class
S1	7.2.83	Lerwot	2yrs	68	69	3.8	27	VIII Young adult
S2	8.2.83	L.Nyubor	2yrs	72	69		27	X Adult
S3	11.2.83	Ujur	2yrs	81	72.5	3.5	22.5	X Adult
	11.2.83	"(Katiang)	2yrs	Femurs only				
S4	12.2.83	Karer	4yrs	Broken				
	12.2.83	Jor	3yrs?	Bones only				
S5	14.8.81	Ujur	3yrs Before present	Broken	48		18	IV Sub-adult ± 3yrs old

* Age class from age classes of southern white rhinos. (Hillman & Anderson in prep.)

Dorsal concavity of skulls of southern white rhinos of the same age, measured in Pilanesberg Game Reserve from a population originating in Umfolozi Game Reserve averaged 7.98 (Range 6.7-8.9,n=25)

During the aerial systematic sample count over 15,200km^2 of the Shambe area in 1981 (Hillman et al) the total estimate for rhino skeletons was 57 ±42, with another 714 ±243 unidentified skeletons.

Habitat

It would appear from all reports and observations that the most important factors defining white rhino habitat in Sudan are a grassland /woodland interface or grassland with scattered tree savanna and availability of water. Throughout their range there they appear to have been associated with areas like this.

In the Shambe and Alliab Dinka areas, there is a wide plain of seasonally flooded 'tooich'grassland stretching inland from the Nile and other main rivers. Bush clump savanna and bush to tree/bush savanna grade into woodland savanna on to the slightly higher laterite plateau inland. From reports it would appear that they used the grassland in the dry season and moved up into the woodland in the wet season. Our observations of them in the dry season were in bush clump grassland in the past. The presence of the wooded savanna appears to have been important for cover and shade, though how much more important it has become recently, when cover from human poachers was required is a moot point. In the Shambe area the human habitation is mainly confined to a strip along the edge of the laterite plateau, inland from the grassland/ woodland interface, but not deep into the woodland. The latter only has ephemeral pools of water in the wet season.

The characteristic habitat that the Dinka informers searched at this season for the rhinos was known as "Rupic". This is a medium to dense woodland or tree-bush savanna, adjacent to the grassland, Because of a tendency to flooding and occupation by wild animals, it is not generally settled. (Settlement being in the "Gokic" woodland beyond the flooding, with temporary use of the grassland for cattle grazing in the dry season.) In the Shambe region, the woodland was dominated by *Anogeisus leiocarpus* and various *Combretum* species. The tree/bush savanna, particluarly further south commonly was composed of *Celtis toka, Balanites aegyptica, Ziziphus mauritiana* with *Caparis fascicularis* and *Salvadora persica*, and with patches of*Acacia seyal* and *A.mellifera.* To the northwest of the Shambe road the bush was more varied with a mosaic of woodland, tree/bush and bush savanna and patches of grassland. It was more suitable for a sedentary habit for the rhinos without the pressures for seasonal movements. There is also no human occupation since it is a boundary area between Dinka and Nuer tribes. A mixture of the same and other species occured here, with *Anogeisus leiocarpus, Combretums, Khaya, Butyrospermum paradoxum, Grewia mollis, Tamarindus indicus* and *Boscia senegalensis*. Bushes and forbs also found included *Dalbergia melanoxylon, Maerua edulis, Catunaregam nilotica, Hexalobus sp.* with the*Salvadora* and *Capparis*. The grassland is dominated by *Hypparhenia spp.*, which grow 2 - 3 metres tall in the wet season and are only palatable when young. The rhinos were attracted to abandoned cattle camps to eat the *Cynodon* and other short grasses.

Eight species indicated by the informers as being rhino food plants were identified. They included only 2 grass species, the rest being forbs and bushes or small trees, as follows:

Species	Family	*Dinka name*	Habit	Occurence
Dalbergia melanoxylon	Papilionaceae	*Rit*	Woody bush	V.common
Maerua edulis	Capparaceae	*Amiok*	Forb	Locally common
Catunaregam nilotica	Rubiaceae	*Car*	Woody bush	V.Common
Maerua nr oblonifolia	Capparaceae	*Kwalek*	Creeper	Sparse
Salvadora persica	Salvadoraceae		Forb/bush	Medium
Capparis nr. tomentosa	Capparaceae	*Doya*	Forb	Sparse
Hypparhenia spp.	Graminae	*Non*	Grass (When young only)	V.Common

Either these are biased observations, or a response to unnatural human pressure forcing them to stay in the woodland, or the northern white rhinos are less exclusive grass eaters than the southern. Some browsing would be concomitant with their narrower mouths and higher head carriage. Rhino food plants indicated by guards in Garamba also included forbs in the old termite mound patches.

Water availability and more recently human pressure have been dominant factors in their habitat choice. One becomes aware just how important and limiting,water is in the dry season,after walking for many hours to the only water point in an area,to find it a small muddy pool when one gets there. Yet villagers are also walking these distances , to fill their water pots. There is therefore human competition with the wildlife for limited watering points; the humans often protecting the water with thorn brush, and the sparsity of water points makes poaching easy. In the wet season poaching is also reasonably easy, since the animals are closer to the human habitation and spoor shows well in the mud.

By far the best habitat we found from all these points of view, was therefore the uninhabited,mixed vegetation area,northwest of the Shambe road, which has considerable numbers of good waterholes scattered through it.

General Conservation Status

A small Game Reserve has existed close to Shambe port since the 1930s. However, since a far larger area was needed for the species it sought to conserve, primarilly, Northern White Rhinos and Nile Lechwe, and in view of considerable interest in the area (Blower 1976), the Wildlife Dept. and Ministry of Wildlife Conservation and Tourism, Southern Region proposed a 600km^2 area as National Park in 1979. WWF Netherlands raised funds for it. The gazettment of the Park has not yet been completed, but the Senior Inspector of Wildlfe in Yirol has marked the boundary at access points and is managing the whole area as a Reserve. This effectively means in relation to hunting, poaching and settlement.

The hunters respect the Reserve, but there are insufficient resources or power for the Senior Inspector to be able to control poaching effectively. He is limited to reports from scouts and informers and police work in the settlements. Negotiations have been initiated with the local people on their relationship with the proposed National Park but far more is needed to lay down rules and to make a compromise with their requirements for grazing and use of certain areas. There is little permanent settlement in the Reserve area except at Karer and Shambe port, but there is semi-permanent settlement such as a few tobacco camps and dry season cattle camps. The initial proposal for the Park put the south west boundary along the line of laterite,since inland from that was a line of settlement. However the Senior Inspector has been marking that boundary as 5 km from Malek, which includes some woodland. This is most important since the woodland is vital in the wet season. Wherever that boundary is, however, there is settlement close to it.

Hunting by local people with traditional weapons is allowed outside, but not,in theory,inside Parks and Reserves. It does occur within the proposed Park, but the Dinka have previously lived compatibly with the wildlife. The present problem stems from commercial poaching and uncontrolled use of arms. If the Dinka felt that it was of advantage to them to have a Park or Reserve there, they could provide an effective anti-poaching factor.

The human/wildlife interactions are greatest below the Shambe-Yirol road. Above it, particularly northeast is one of the most beautiful and valuable for the wildlife, areas. It has mixed habitat with good water and most important no settlement, since it has been a boundary zone between Dinka and Nuer.

Despite the lack of rhinos, the numbers and variety of other wildlife species and the richness and uniqueness of the habitats make it an area definitely worthy of conservation. Whether it be as Park or Reserve, it would would be most important to maintain the north eastern area sacrosanct for wildlife, while a workable compromise will have to be made with the people for the more southerly area.

In view of their priority for the area and in response to the recommendations made and agreements negotiated following the IUCN mission there in April 1981 (Kundaeli, 1981, Hillman et al 1981) the Ministry of Wildlife transferred one of their best officers, Gabriel Gurguri, there as Senior Inspector in 1981 and increased the Game Scout force and deployment to outposts.

In Febrary 1983, game scouts were stationed as follows:

3 at Malek
2 at Adior
3 at Karer (but temporarilly absent due to guerilla threats)
3 at Pagarau (one with Nile Safaris)
3 at Manyang (operating a road block)
3 at Shambe port

the remainder and the officers are at Yirol.

The following transport and communications equipment was available:

1 Steyr Pinzgauer vehicle	- serviceable, but with no fuel.
9 bicycles	- of which one was being recovered from a transferred scout, 3 were at Yirol and the rest at outposts.
4 VHF Johnson radios	- serviceable, but not installed due to lack of power sources.
1 SSB Stoner HF radio	- serviceable, but in March it was transferred away for anti-poaching units.

Although the aerial survey in 1981 laid doubts on the value of the Shambe area specifically for rhino conservation, therefore justifying the use of rhino funds, it was recommended and agreed that to enable to Dept. to carry out some effective work in the interim, the following should be given:

1 motor-bike for the Senior Inspector
Solar panels and batteries to install the radios
More bicycles for Game Scouts
Fuel on a one-to-one basis with the Ministry

These are still needed, though some fuel has been given. WWF/AWLF radio expert consultant Howard Wood, after examination of the Johnson radios has said that they should be adequate to provide the communication needed between Yirol, Adior, Pagarau and Shambe and various other areas, considering distance and terrain.

The Game Scouts are inadequately trained. Effectively at present they receive only training in handling of firearms and some drill. A Game Scout Training School is being developed near Juba, but this will take time. The Scouts are not necessarilly motivated to protect wildlife, and may only be doing it as a job. Unless they are adequately supervised, therefore, they are themselves a potential threat, armed and based at outposts, perhaps with pressure from civilians.

This makes it even more vital that the Senior Inspector has adequate transport to allow him to carry out in-field training and supervision and to be able to respond to reports.

A system of 'informers' has been developed. These are local people who know the bush well. Many of them are honey-hunters. They have been reporting rhino, elephant and poaching signs to Gurguri and working with the game scouts to give them some experience of the bush and knowledge of specific areas. They are the most valuable part of the System at the moment and need to be strengthened. They have been paid occasional casual labourers wages on a part-time basis(S£ 15 per month), but such wages are not always available, especially in the wet season. It is most important that they are employed part-time on a more stable basis, not only for the valuable information they provide, but also because if they are not on the side of the Wildlife Dept. they will be aiding the poachers.

There also exists a system of 'honorary wardens' using local chiefs. This also should be strengthened. They are probably the most effective law enforcement factor among the local people.

An overlying problem when we were there, which later erupted, was the threat of guerilla war. There has always been antipathy between North and South Sudan, which earlier led to 17 years of guerilla war, when southerners took to the bush and became known as Anyanya. Recently dissatisfaction in the South has grown, particularly among the Dinka, and fired partly by northern control over discoveries of oil in the south. During the 1983 dry season, a number of men had taken to the bush again and were known as Anyanya II. They occasionally terorised villages.The men, including game scouts had therefore moved out of some. Their presence also necessitated deployment of the army to the bush and the concomitant increase in poaching and increased the difficulties for the Wildlife Dept.

Since Gurguri is a Dinka from the area, he has a good understanding of the people and their approach. He has maintained stricter codes of control than previous officers, and despite lack of resources has made use of those appraoches that he could, eg the informers. With a minimum of a few more resources to enable transport and communications in the most economical way he could achieve far more, in particular in working with and training and supervising his scouts. A few more resources would also boost morale and motivation, and it seems, would increase status and hence authority in relation to other government officers.

Hunting and Tourism

For many years sport hunting has been , with traditional hunting, the main use of wildlife in the Southern Region and the main earner of foreign exchange. If properly controlled it gives a tangible value to conservation of wildlife, since photographic tourism is difficult where facilities are so inadequate. In recent years, poaching has eliminated many of the elephants that were an attraction to the hunters, and terrorism of hunting camps by poachers from the north has led to a considerable reduction in the hunting. Some companies are turning to developing specialist photographic tourism, particularly in line with all the recent internationally aided conservation development in the South. The main of the these is Nile Safaris who have a long term investment in the country, the best financial and logistical back-up and motivation. Planning specialist tours associated with the Nile they have long been interested in Shambe., while even at present would like to be able to take clients on non-hunting game drives from their nearby camp.

Whether or not conservation aid comes to an area, it does not represent a long term investment nor commitment. The government could not support adequate conservation of the area alone. But if tourism was providing an income from the Park or Reserve, it could benefit the government, the

local people and hence the wildlife,while the presence of people in the field in whose interest it is to conserve wildlife cannot fail to be beneficial.

In the absence of a viable population of rhinos, it is difficult to justify spending large amounts of money raised for conservation of rhinos (though there is a moral commitment to provide some help), but a reciprocal arrangement, a symbiotic relationship with a company who could carry out long term development and help protect an area, in return for long term rights, seems the ideal compromise solution. (unless war proves to be an over-riding factor, in view of the recent developments in Sudan).

Such a proposal was made to the Wildlife Dept. and discussed with Nile Safaris. A meeting was held on 22.03.83 at which the following were present:

Fraser Tong	Director W/L Dept.
Henry Minga	Deputy Director (Projects)
Charles Acire	Deputy Director (Conservation)
Justin Jago	Asst. Director, Tourism
Angelo Dacey	Hunt Co-ordinator, Nile safaris
George Safariou	Manager, Nile safaries
Kes Hillman	
Fraser Smith	

There was general agreement in principle, and it was left to the Ministry to draw up details of the conditions suggested and open it to tender. Fraser Tong agreed to go the the Shambe region for further talks with the local people to finalise negotiations. It was suggested that initially it would not be possible to enforce the full rules of a National Park, ie no human settlement or uncontrolled use, but that at least the southern area should initially become Game Reserve, while the northeastern sector is maintained as exclusive wildlife preserve.

Summary and recommendations for the Shambe region

1. There are almost certainly a few Northern White Rhinos remaining in the Shambe region in the uninhabited area north west of the Shambe-Yirol road, but it is extremely doubtful that they could together constitute a viable population. Major losses were in 1979 through 1981, due to poaching for the horn.

2. It is no longer possible to justify a major investment there specifically for the purpose of conserving Northern White Rhinos. It is, however, a valuable area with an attractive and varied ecosystem not conserved elsewhere, with reasonably large numbers and a wide variety of species of other wildlife, and the possibility that some rhino still exist there and might survive if the area is protected. It has a knowledgeable, well-trained Senior Inspector of Wildlife, with a good understanding of the country and people, and it is not threatened by the same scale of poaching that faces a large part of western Southern Sudan. It is justifiable and important that at minimum, the assistance agreed to in 1981 comes through, to support the action taken so far by the Ministry, to fulfill some of the previous committments and to provide sufficient resources and motivation to give conservation of what remains a chance. Further assistance should be considered , as specifically required,in the context of developments in the control of the Reserve through confirming its official status and for example in conjunction with private enterprise investment for tourism.

3.The Senior Inspector does not at present have the minimum resources to do his job properly and the Game Scouts are largely untrained. Small improvements in transport and communications, ie

1 motor bike
solar panels and batteries and instalation for the radios
more bicycles
fuel

would make a considerable difference in enabling supervision and training of scouts, law enforcement and following up reports of rhinos, etc.

4. The proposed Park or Reserve should be gazetted as soon as possible. It should include further north in the Nuer Dinka boundary area than is currently proposed, preferably into Nuer country, with some frontage on an uninhabited section of the River Mooich. In the south west, it should include some woodland, at least to 5 km from Malek, and further inland where there is no settlement. An agreement on limited grazing rights, but no hunting or permenant settlement may be needed in the south, but the area north west of the Shambe -Yirol road should be exclusive wildlife preserve.

5. The system of 'informers', using local, knowledgeable honey-hunters and others is useful and practical. It should be perpetuated and consolidated. To maintain motivation and loyalty they need to receive a year-round part-time salary.They should work closely with the Game Scouts and train them in bushcraft. It is suggested that they retain the right to collect honey, but not to trap or hunt animals in the Reserve.

6, The system of employing local chiefs as 'honorary wardens' would also appear to be useful and full use should be made of them in law enforcement and in communicating to the people the laws and the developments and advantages of the Reserve.

7. Game Scouts should be given 'in field' training and supervision, and if possible, uniforms.

8. The best long-term hope for conservation of the Park/Reserve and developement of the benefits from it would be a symbiotic relationship with an organisation that can function efficiently under conditions in Sudan, such as a well-established and developed safari company. Such a company could get long term use and development rights for non-consumptive

tourism and in return provide an anti-poaching function and other help, to the Ministry. Any pure conservation aid given within such a functioning framework would also stand a better chance of acheiving its goals.

9. Capture and translocation of rhinos to safer holding has been suggested by the Wildlife Dept. (C.Acire, pers.comm.). It would be a difficult, time consuming and expensive operation, and probably not justifiable for Shambe alone. However subsequent investigations indicate that there are probably also rhinos still left in Southern National Park and even in the Meshra area. With the possibility of trying from all these areas, if aid for air support can be given, capture and translocation of a few of the remaining individuals, with a view to possible future re-introductions and to contribution of material to a 'world gene-pool' of Northern White Rhinos, is suggested. It is the only sure hope at the moment for what is left.

3. SUDAN - SOUTHERN NATIONAL PARK

Reports

Southern National Park comprises 16,640km^2 of woodland and tree/bush savanna, with patches of grassland and bush savanna. It is cut by 2 main rivers and bordered by another. It has virtually no access roads into the Park. It has therefore long been a major reservoir of wildlife in the Southern Region west of the Nile. It has never carried a high density of white rhinos but they have long been known to occur there. They were seen there on Watson et al's low intensity aerial survey in 1976. On the low intensity aerial survey carried out by the University of Rome and Ecosystems Ltd in November 1980, 3 were seen, giving a population estimate of 168 ± 42% (Boitani 1981)

Since the 1980 season, gangs of heavilly armed and mobile poachers from the North have come across the border, poaching and terrorising anyone who stried to stop them. They came first into western Bahr-el-Ghazal, particularly killing elephants, but one of the early signs for the rhinos in that region was one shot 3 years ago near the police post at Yabulu, east of Diem Zubier. They were also almost certainly killed from where they previously occurred between the Musuri and Pongo rivers.

Each year since, they have advanced further south and east, until in this season it was reported that they had occupied Southern National Park. This was confirmed by a flight over by Snyder and Acire of the Wildlife Dept. They were armed with new automatic G3 weapons and well supplied with ammunition. It was believed that they had radio and possibly even helicopter support. They certainly had baggage animals. Two poachers caught, said that they had all been recruited from towns and villages in the north and that they were being paid S£10-15 per day salaries. (Game Scouts earn S£40 per month). It was estimated (Tong pers. comm.) that there were over 15 camps in the Park and that the largest held over 300 men each.

The Wildlife Dept. anti-poaching units are seriously under-equiped, and although by March they had recovered 220 tusks, killed 10 poachers and captured 2 and killed many pack animals, there was felt to be little hope for the rhinos in the Park.

There appeared little to be gained except probably death and loss of vehicle, by going in to the area on the ground, and no one was prepared to risk aircraft and life on doing a low level intensive aerial survey of part of the Park, until the beginning of the wet season, when the poachers began moving out. Clearance for flying was obtained for April/May, but at the last moment neither Cobb, Borner or Snyder's aircraft were available. It was hoped to try in June, but by then Southern Sudan had erupted in rebellion and aircraft clearance was not possible.

In April, however, we received reports of a young rhino having been seen in the Park north of Jebel Angeleri (a hill in the south east) and accordingly went to the area via the Wildlife Dept. at Maridi and Game Posts Whoka I and II, with W/L Officer Simon Maswa. There, the following reports were received from Game Scouts Samuel Koroket, Archangelo Juma villagers, Levi, the honey hunter who acted as guide, and Maswa.

In the 1981/2 dry season, 2 rhinos were seen near Whoka I
In the 1982/3 season only 3 patrols into the bush were made. On one, 1 young rhino was seen, on another 2 were seen near the Park boundary on the River Tugaro. Two rhinos were seen by Koroket in March crossing from the boundary to the Park near Whoka I.

Maswa reported that a rhino had been killed on the River Ibba in the west of the Park by Urubele people and the horn sold to Arabs.

Archangelo Juma, the Scout who saw the young rhino reported that on 24.2.83, he saw the tracks of a large adult rhino crossing into the Park, followed them and found a young rhino grazing along the edge of a stream. Usually many rhinos crossed this way in May and June, but this year he thought they must have mostly been disturbed by poachers.

Many reported that rhinos occurred near Jebel Angeleri and the River Tapia, if it still had water. They also reported seasonal movements of rhinos in response to water availability.

Poachers were reported to have camped north of Jebel Angeleri in December and January, to have made another camp east near the boundary and another east of the road. One camel had died at a camp, proving that they were from the north. It was believed that they had since retreated.

Signs of Rhinos

The Game Scout who had seen the rhino recently was away when we first arrived at the Game Posts. We therefore took as guide a honey hunter who said he knew the area in question. As usual, it involved driving straight through the bush, but this was the densest Tree/bush savanna and Woodland yet, so progress was slow. We walked around Jebel Angeleri and checked the Gulu and Ulukuru rivers for water and signs.

Locations	*Reports*	Habitat	Driven/Walked	Rhino signs
M Boundary to J.Angeleri	*Rhinos seen in the region but further north recently*	WS-D TBS-D	28km/	-
M J.Angeleri to Duri R.	"	"	15km/	-
M J.Angeleri to Ulukuru & Gulu Rivers	" *Always been a good area for rhinos*	TBS-D-O BS -M 2 water points	/21.2km	1 Possible rhino spoor (old)
M Duri & Dukomoko Rivers	*Guide reported having seen rhino signs there recently*	BS-M Water at both rivers	/4.8km	-

We found no signs of rhinos having been poached, but in all we found 8 poached elephants and 3 poachers camps and 2 poachers. The camps and poachers were just local people. The poachers were armed only with spears and a dog and had just killed a baby warthog . We also found 8 dead buffalo, but all appeared to have died of disease, with necks twisted back.

Most wildlife seen was up in the woodlands towards the boundary, where there was some green flush. Near J. Angeleri there was very little grass and most grazers appeared to have moved away.

In such a huge area, with difficulties of access and in a short time, and in the lower density area of a low density range for the rhinos, it was not surprising not to see signs. To be reasonably thorough, the Park had to be covered by air and co-ordinated ground work. So far this has not proved possible, but may later.

General Conservation status

The Park has full gazetted status, but since it is such a huge area, access is so difficult, the Wildlife Dept. is so seriously under-equiped and trained and there is little to motivate them, it is virtually uncontrolled. Recently with the poaching threat in the western side of the Park particularly, there have been more patrols that side and game scouts have been transferred away from east to the Anti Poaching Units. At Whoka I, for example, there are normally 12 guards. When we were there they were down to 3. Discussions indicated that very few patrols are done in a season. Virtually the only means of communication between the Game Posts and Maridi would be by bicycle, if available, or messages sent with a visiting doctor. Occasionally a vehicle is stationed at Maridi, but usually fuel is unavailable. There is a radio link between Juba and Yambio, further west.

Local poaching for both ivory and meat appeared to be common. Most elephant skeletons found were 2 yrs since death approximately. More details are given in the wildlife lists in Appendix I. All poaching camps had smoking racks. At one elephants and crocodile had been poached. At another crocodile had been killed. The third, on the outside of the river that formed the boundary, may have been a fishing camp, which apparentely is legal, though other poaching was probably also being done.

It is not strictly valid to do so, since poaching density must vary throughout the Park, but, if one assumes we saw skeletons on average, up to 50m. either side and travelled 68km, finding 8 elephant skeletons there could be 19,576 elephant skeletons in the Park. That is with not even seeing any of the fresh ones from this season's northern poaching, but it was close to the boundary, therefore a heavy local poaching area.

In 1980 a team from the University of Rome made a detailed survey of the Park and environs. They produced a comprehensive management plan and development recommendations (Boitani 1981) and it is understood that the Government of Italy was prepared to finance this if formally requested to do so. The possibilities of implementing such a plan at present have been over-ridden by the recent massive organised poaching. It is suggested that the Wildlife Ministry ask first for help to control that situation, then for conservation re-development of the Park.

There is still a lot of wildlife left in the Park, probably partly because of access difficulties and because it is large. It has not been as vulnerable as some areas to armed, often vehicle based poachers from the towns. Until this last season, the majority of the poaching has probably been local. It is desparate and urgent now, however, that effective measures are taken to stop the poaching from the north. This requires political pressure, as well as comprehensive aid to anti-poaching.

As a matter of interest, the elephant skulls found were the largest I have ever seen, as were many of the elephant spoor, both here and in the Shambe region. Of the poached elephants found, two were very young elephants and the roughly six inch long ivory had been left. One was at the poaching camp in the Park between J. Angeleri and the Maridi River. The other was in a group of three elephants that had died together in the dense bush savanna between J. Angeleri and the boundary. The ivory was recovered by the Wildlife Dept.

Maswa, the Wildlife Officer, was to be commended for his knowledge, integrity and willingness and ability to work. He should be given advanced training.

Summary and recommendations for the Southern National Park

1. Due to circumstances beyond our control, there has been insufficient coverage of the Park for a really thorough assessment of the situation. Intensive aerial reconnaissance is also needed, and ground work in the west.

2. There is heavy poaching, both on a major organised scale, from the North and on a lesser scale, locally.

3. In view of the credibility of some of the reports of rhino sightings, the vastness and remoteness of the Park, it is believed that a few white rhinos still exist there, but another season's heavy poaching could spell the end.

4. Resources in Sudan are so limited that the W/L Dept. staff are inadequately equiped, supervised, or for many, trained to control such an area, or such a poaching threat. Aid is needed.

5. The major problem at the time was the large scale, well organised and backed poaching from the north, which also has political implications. Thousands of elephants have been killed, and an unknown number of rhinos. Any that are come across, however are unlikely to be spared. It is destroying not only Southern Sudan's wildlife, not least the rhinos and elephants, but also its safari business. It requires a major and urgent effort to control it, both at the political level and in field anti-poaching support.

6. Capture and translocation to safer holding of as many as possible of these and other white rhinos that have no immediate future has been suggested by the Wildlife Dept. This would not be easy, but in view of the overall situation for northern white rhinos it is suggested that if outside support, particularly for aerial work can be obtained, it should be tried, here and elsewhere in Sudan. The rhinos should be held with a view to re-introduction if the situation improved sufficiently, and should be available for contribution of material to a 'world gene pool' of northern white rhinos if required. Wherever they were held, they should remain the property of Sudan. Capture and removal in Southern National Park would have to be done by helicopter .

7. It is suggested that the Wildlife Dept. approaches the Government of Italy for help,initially to combat the poaching, then the Park re-development.

8. It is also suggested that a co-ordinated action by a number of funding bodies jointly be put into action to help the country develop an effective anti-poaching force.

4. SUDAN - LANTOTO PROPOSED NATIONAL PARK

Two areas have been proposed by the Ministry of Wildlife, Southern Region, as National Park at Lantoto. One comprises about 750km2 from the Zaire boundary, adjacent to the north-eastern side of Garamba National Park, to within 10km of the Yei-Maridi road. The other is to the north east, on the far side of the road, along the Yei River. A corridor has been suggested between them, but there is settlement along most of the road that divides them. There appears to be some question about the value of giving both areas National Park status, and therefore of deploying limited resources to protect them.

Information on the area has kindly been provided by Henry Minga (Deputy Director) and Phillip Angutwa, (Senior W/L Inspector, Yei), David Billing (Project Development Unit), Simon Maswa (Wildlife Officer), George Conn (Director, Kagelu Forest Reserve), Dimoyelele-ku-Gilima-Buna (Conservateur, Garamba National Park), Angelo Dacey (Nile Safaries), Chris Hillman, Yani Nungovitch, and our own aerial survey of the southern part.

Reports

Before the war there were rhinos along the Zaire boundary. Maswa reports seeing them there as a young boy in the 1960s.

Some years ago white rhinos used to occur in the Loka area, at Kajo Kaji and along the Yei river near Nuni, and even up as far as Jebel Lado (Dacey A.)

Signs of wildlife have dissappeared from most of Yei district over the last 9 years (Conn G.)

There was an unconfirmed report of spoor of a rhino crossing the border from Garamba last year.

On a recent visit to Yei river near Nuni, Minga saw a group of hartebeeste.

A survey by the PDU has found that the southern part is unsuitable as agricultural land, while the northern part has potential, and to make it a Park would involve moving one whole, small tribe of people. Part of the northern sector is forestry land. The southern sector forms part of the Nile/Zaire rivers watershed.

Signs of rhinos and other wildlife

The details of the aerial survey are given in the separate report on the count (opp.cit.). Only the more southerly area (Lantoto South) was able to be covered on the count. The only animals seen were common and red-flanked duiker *(Sylvicapra grimmia & Cephalophus rufilatus)*, warthog *(Phacochoerus aethiopicus)* and in adjacent areas, red river hog *(Potamochoerus porcas)* No white rhinos were seen anywhere near, since those in Garamba are considerably further south. The habitat was largely woodland and dense tree/bush savanna. It is hilly and very little surface water was seen. Thus, while it is an attractive area, it is not ideal white rhino habitat and they were probably at a low density even when they were there. It is important however as a watershed and for being adjacent to Garamba National Park.

General Conservation status

At present Lantoto South has some Reserve status, but neither area has been officially gazetted. Signs, however mark some of the boundary, and there were at the time 2 Game Scout patrol posts in Lantoto South and another to be manned shortly. There was good communication and co-operation across the border with Guards in Garamba.

No settlement was seen in the Proposed Park, during the count, but there was settlement and limited agriculture all along the Yei-Maridi road.

The main reasons for proposing the areas as National Park appeared to be:

1. International Conservation bodies (such as the OAU Wildlife Charter, IUCN etc.) recommend that where a Park or Reserve abuts an international border the neighbouring country should, if feasible conserve adjoining land. In addition there has also recently been a meeting between Sudan, Zaire and Uganda to discuss wildlife problems across borders and develop co-operation.

2. Yei river area was rich in the past and proposed as Reserve in colonial times.

3.Lantoto used to have northern white rhinos and it was felt that if it was protected they would come back.

4. Yei district favour the idea of a National Park.

5. It would conserve a reasonably interesting area and most importantly a watershed and catchment.

6. There are no great human pressures on Lantoto South.

To examine these reasons in relation to what has been found:

1.This is a very valid justification for Lantoto South, and as long as the Game Scouts are adequately supervised and backed up , so that they do not become a threat to the wildlife themselves, it should benefit both Parks. Corridors are rarely successful and there is settlement all along the road between the two areas. Lantoto north would therefore have little value in this way, though not enough is known of any movement patterns of animals in the region. It is unfortunate that the proposed Park does not border the whole of Garamba. The rest borders on Maridi district and there is a road close to the border. If the Park goes ahead, however, this area should be examined more closely for possibilities.

2. Insufficient is known about Yei river area, but reports indicate that there is little wildlife left. Some of it already has forestry status and the potential human conflict is a disadvantage.

3. Due to the paucity of white rhinos in Garamba and the type of habitat in Lantoto, it is extremely doubtful that any would come back.

4. If the people want and would respect a Park it is of value, but the Ministry also has to consider its limited resources in relation to national priorities.

5. It would be valuable to ensure prevention of de-forestation or spread of agriculture on the watershed.

6. Conservation area appears to be the best land-use for Lantoto South, but not necessarilly for Lantoto North.

Summary - Lantoto proposed National Park

There are no northern white rhinos now in the proposed Park area, nor likely to be any in the near future, even if it was protected. It does, however appear to be valuable to give National Park or Reserve status to Lantoto South, as long as enough control of Game Scouts can be maintained to avoid them becoming a threat themselves. Most evidence indicates that there would be little value in using Southern Sudan's limited resources in trying to protect Lantoto north for wildlife, but insufficient is known about it to comment authoritatively.

5 SUDAN - MESHRA PROPOSED GAME RESERVE AND TONJ AREA

Information in the Meshra area was provided by Girardo Wol, (Senior Inspector of Wildlife, Tonj) his Game Scouts, policeman Manok Deng, teacher Edward Kur, hunters Mbil, Achok and others, Wol Dwok , and by Augustus Roger of Sudan International Safaris.

We travelled from Tonj, via Thiet, through Meshra proposed Game Reserve to Meshra a'Req and back further west via a forest near Majak where rhinos had been reported.

Reports
Recent reports of rhinos in the area were as follows:

September 1982 - Game Scout saw 1 black rhino male near Wunkwe, when investigating elephant poaching. (Location N)

October 1982 - Game Scout saw 1 white rhino near Parbar (in Meshra prop. GR) (N)

September 1982 - Manok Deng and Achok saw a male, female and young white rhino near Marial (N)

December 1982 - Dinka hunter/cattle herder saw 3 rhinos that ran out of long grass at Loldin near Meshra, when they were burning the grass (N)

March 1983 - Manok Deng and Mbil saw a female white rhino and calf coming to drink near the tooich at night, west of Meshra.

Villagers reported rhinos having been seen recently in forest near Kongor, Apuk and Majak (O)

Poaching in the area started between 1978 and 1980. In 1979 a poacher killed a rhino near Majak, was caught in 1980 and fined S£1500, though by then he had disposed of the horn.

The rhinos use the woodlands in the wet season and in the dry move out into the tooich grasslands and get displaced across the river to 'islands' near Meshra, by the cattle herders.

Poachers come out from Wau, mainly in the wet season, when the rhinos are closer to the villagers and leave easy tracks. They pay local informers to guide them to rhinos, but the rhinos are becoming much more difficult to find now.

Roger saw no signs of any rhinos or elephants in the areas he hunts north and east of Tonj, but not as far north as Meshra area.

There seems to have been some doubts about distinguishing between black and white rhinos. Close questioning about habits and appearance indicate that at least some of them have been white rhinos. Very old reports indicate both species in the vicinity, for example a Danish expedition to the area in the 1930s (Molloiy) . Mackenzie (1954) mentions no forther substantiation of the presence of black rhinos north west of Wau.

Wau is a main trade link with Khartoum for the export of ivory and rhino horn. Many dealers exist there, having had permits granted to deal in "found ivory". (The Wildlife Dept. reports that they have ceased issuing such permits).

Signs of rhinos

Locations	*Reports*	Habitat	Driven/Walked	Rhino signs
N Parbar (Fulbar) -Marial-Meshra (through Meshra prop. G.R.)	*White rhinos seen there in woodland in September & October 1982; & in tooich in March 1983*	BCS TBS-M WS -M GS Water at Meshra	13km/	-
N Meshra - Loldin	*White rhinos seen leaving burned grass Dec. 1982*	GS BS-M	4km/2km	1 faintly possible old sign
C Forest nr. Majak	*Rhinos seen there recently.*	WS-M TBS-D	20km/6km	-
	Tracks seen 2 days previously			Tracks in dust blown away
	Tracks seen by young boy crossing path early that morning by Amoko R.	Water in Amoko R.		When we reached the place, cattle had just crossed & obliterated poss. spoor.

Summary - Meshra area

We covered a total of about 460km in the two main days there, through areas, that probably once had rhinos, but now could no longer be expected to since there were people. We were unable to confirm any of the reports by seeing definite signs of rhinos, but it would appear that a few may still remain in the region . As previously mentioned, arranging aerial reconnaissance there had been unsuccessful. It would appear that there still may be a few rhinos left there, though their future is severely limited. In view, especially of their reported distribution at that time of year, an intensive co-ordinated ground and aerial recce is needed there. Had the survey of Southern National Park not been curtailed by rebellion, it was hoped to do some aerial work in the Meshra area at the same time.

The area proposed as Meshra Game Reserve, does not appear to have outstanding or unique habitat or large numbers or variety of wildlife. It is also occupied by villages. Although it could have been worth preserving at an earlier stage, or if resources were not so limited. It is felt that under the circumstances this area has to be a very low priority for the Wildlife Dept. There is an urgent need, therefore to try to remove some of the last remaining rhinos to safe holding, in conjunction with the same exercise elsewhere in Sudan. This is an easier area for access than Southern National Park, apart from the tooich swamps.

RHINO HORN

It is the trade in rhino horn that has led to all the recent reductions in the northern white rhinos of Sudan. Many rhinos and other species were killed in the civil war. But after that there appeared to be something of a lull in rhino poaching until a full realisation of the value of rhino horn came.It appears to have come slightly later than the wave of rhino poaching that hit black rhinos elsewhere in Africa

The majority of the horn appears to have been traded out through Khartoum especially since trade in wildlife products was closed in Kenya. Wau is well known as a link point, as well as Juba, since Wau is on the end of a rail link with Khartoum and close to good wildlife areas. Many ivory traders existed legally until 1982, by using permits to trade in "found ivory". It was probably easy for them to trade in rhino horn as well.

On the 4th of May this year, game scouts in plain clothes recovered 3 rhino horns in a suitcase that an Arab was taking to Khartoum via Juba Airport.The largest weighed 18.5rottels(lbs) and measured 98cm long by 64 cm basal circumference. It and its posterior partner were fresh, and it was said they must have come from the Shambe region, because that population was known for its large anterior horns.

There are many instances of small time trading too, with Europeans being offered horn. An anthropologist near Yirol was offered horn from a rhino killed near Lake Nyubor. A Peace Corps worker has been offered it near Yei, and a hunter near Maridi. Both the latter could have come either from Southern National Park or Garamba. We have, in the past been offered horn on the Sudan/Zaire border.

A Greek trader who was known to have traded in ivory was investigated using a cover story. But it appeared that he had only once had rhino horn and had got rid of it to Khartoum as soon as possible. Whereas it had long been possible to obtain documents covering trade in ivory , hunting or killing of rhinos has been prohibited for many years and any rhino horn was obviously illegal. It is however more lucrative per unit effort and the supply was far smaller. Filling the demand has had more effect!

The trader estimated that the present price for rhino horn would be around S£120 per kg (US$92).

Between 1973 and 1983 the Wildlife Dept. recovered 47 horns, which passed through their store.

11	from Yirol	(Shambe region)
11	from Wau	(S.N.P. region or Shambe)
2	from Maridi	(S.N.P.or Garamba)
7	from Malakal	(en route to Khartoum probably)
2	from Yei	(S.N.P. or Garamba)
11	from Juba	
3	at Juba airport	(en route to Khartoum)

Of the 16 pieces still in the store in 1983, weights were as follows:

In Rottels (lbs) : 18.5, 8, 4; 10.5, 5; 9, 11, 7, 11, 7, 4, 6, 6, 6, 1.5, 11.

The average weight of the 16 pieces is 7.8 lbs(3.54kg)(Range 1.5-18.5 lb)
The average weight of what were probably anterior horns is 11.8lb (5.35kg)
The average weight of horn per rhino is about 15.6 lb (7.08kg).
The average weight of horn per rhino from 37 southern white rhino horns was 4.07 kg (measured from an ex-Umfolozi G.R. population at Pilanesberg G.R. , own data, Hillman 1981)

Considering the population estimated in 1979, over 800 horns (from over 400 rhinos) must have left the Southern Region over the past few years, to the benefit of a few pockets.

Of the ivory in the store records, there were 870 pieces in 1890/1, of which 360 were from hunting. There were only 651 pieces in 1981/2, of which 186 were from hunting. Average tusk weight from one safari company dropped from 49 to 36 lb between only 1980/1 and 1981/2. Sudan's 100-lbers are no more. All the ivory recovered from poachers this season was of very small tusks.

Sudan is a member of CITES, but only ratified last year.. Hunting trophies are exported separately by the companies.Thousands of pieces of other ivory have been exported from Sudan to the Middle East, all with documentation issued in the Northern Region. Yet the North has no elephants , One obvious need is therefore to have the CITES scientific authority or some other form of control, for species that exist in the South to be controlled by the South.

Under CITES there is no legal export of rhino horn for commercial purposes.

POACHING AND THE GENERAL CONSERVATION SITUATION IN SOUTHERN SUDAN

Until recently, Southern Sudan had some of the largest wildlife populations remaining in Africa, and up to 4 years ago probably had more northern white rhinos than any other country. Now the rhinos remaining may be numbered in the tens at most , and estimates of elephants killed each year vary from 5,000 to 30,000 (Tong F. & Snyder P. pers.comm.). The hunting industry earned around $600,000 each year for the country . The Southern Region earns very little other foreign exchange. That income is seriously threatened.
In the region of 4-500 northern white rhinos must have been killed in Sudan since 1979, if previous estimates were right.
Poaching is a major problem in the Southern Region and it has wider implications than just those for wildlife. There appear to be 3 levels of poaching:

1. Traditional hunting by local people for meat and now occasionally commercial value, which is illegal if done in Parks or Reserves.
2. Commercial poaching, by the higher income level, who can get weapons and ammunition and even vehicles. Many of these are government servants, including police, local government and the army. Often they have more resources and higher status than the Wildlife Dept. officers who would try to stop them. The army, especially are a law unto themselves. This level also includes game scouts . It is a perpetual problem in any country that the men sent out in the bush to protectthe wildlife are in an ideal position to 'utilise' it if they do not have adequate motivation or supervision.
3. Massed, organised invasion of poachers from the north each dry season, for the last three, with financial and power backing. It may be associated with the North/South conflict and is believed by the Wildlife Dept. to even have Libyan support.

1. The true traditional hunting is no major problem, and is in fact an advantage in giving local people a reason for valueing wildlife. It may be the best way of utilising some of the huge populations of grazing herbivores. In some areas,such as the Shambe region, however, it appears to be having an effect on the wildlife. Many areas that should be full of animals are silent, and bones of wild game lie around camps. A few Dinka have been seen with guns, and then the poaching is liable to become commercial. Local poaching, particularly of crocodile was common in Southern N.P.

2. This second type of poaching is what has almost eliminated the white rhinos of Sudan. It was known , for example, that two policemen were promoting most of the rhino poaching around Shambe until two years ago. There are a number of instances of tusks and rhino horn being recovered from army vehicles. A teacher near Shambe was known to have been involved in poaching, and near Alliab, Dinkas reported that game scouts had shot rhinos. Basically anyone with a gun may feel he has the right to shoot animals.

South Sudan covers 648,000km^2. The Wildlife Dept. has 1350 game scouts and 150-200 officers (Tong F. D.C.)to control 36, 426 km^2 of wildlife conservation areas and far more of hunting areas; Very few of the men are adequately trained, although there are some excellent people, and ex-Anyanya can be fierce fighters. There are 8 functional vehicles (of which 5 were donated by Safari Club International), but often there is no fuel to run them. There are 4 HF radios (donated by WWF) and some Johnson VHFs, most of which are not installed because there are no power sources. In a country where communications and travel are so difficult, salaries are often late and few of the game scouts have uniforms. It is difficult, therefore for them to be adequately motivated or supervised. Until recently they did not have automatic weapons, but the poachers did. The status of the Wildlife Dept. people was therefore often low in the remote towns, making it difficult them to wield authority, and they do not have powers of arrest over army.

However, a training school is being developed. Against the major poaching threat this season, the anti-poaching units recovered 250 tusks, killed 11 poachers and captured 2. The Minister has recently secured raised salaries (on level with police), powers of arrest and automatic weapons for 3 of every 10 game scouts. With help and effort, improved resources and particularly functional maintainance systems, poaching control could improve (if war does not over-ride them), but these things are badly and urgently needed.

To get any control of this level of poaching it is also necessary for other government departments to co-operate, especially the army. The latter would need to work with the Wildlife Dept. to obtain meat supplies in quotas in designated areas, and the Wildlife Dept. need to have authority over them in Wildlife matters. This could probably only be achieved by directives from the top and effective law enforcement. It is not really human nature to value a collective advantage over a personal one, so that far stricter sentences and enforcement of them are a vital back up to any improved field anti-poaching by the Wildlife Dept.

3. Over-riding the two previous insidious and continuous forms of poaching, there has been for the last three dry seasons, a major invasion of poachers from the North. With horses and pack camels and donkeys, well-armed with automatic weapons (G3 and Kalashnikovs) and plentiful boxes of ammunition, they are a law unto themselves. It is said they have radios and even helicopter support, though the latter has not been proved. Captured prisoners said they had been recruited from towns in the North and are paid salaries higher than those of the Wildlife Dept. It is beleived by the Wildlife Dept. that there are military links and Libyan backing, and it is likely that this is linked with the North/South conflict. After a recce flight this season, the W/L Dept. estimated there were 15 to 30 camps in Southern National Park, with 10 to 300 men in each. Well over 1000 people must have been involved.

So far they have been confined to Bahr-el-Ghazal and Western Equatoria (which does not include areas like Shambe), but each season they moved further as the wildlife became less, and this season occupied Southern National Park. They have probably killed a large proportion of the northern white rhinos there and will certainly kill the rest unless they can be stopped.

They have made open threats to safari hunters, who have had to leave their concessions for the safety of their clients, and are systematically removing the animals that can be hunted. Estimates of numbers of elephants killed vary from 5,000 to 30,000.

Not only, therefore are they destroying the wildlife resources of Southern Sudan, and as far as this report is concerned, what could have been the last major population of northern white rhinos in Sudan, but they are also destroying this valuable form of income..

The anti-poaching units of the Wildlife Dept. have harrassed them and had some successes this season, but they stand little chance of being able to stop the problem without co-operation in control from the North and stronger, better resource-based forces on the ground.

In March, HE the President gave directives to the Governors of Kordofan and South Darfur to take action against northerners poaching in the South, and has granted the Southern Region Ministry better facilities and powers, as mentioned earlier. He also presented and award for bravery to Senior W/L Inspector Angutwa.

On top of all this, however there has been the recent resurgence of potential guerilla war and rebellion. Ultimately politics over-rides all else in wildlife conservation.

BLACK RHINOS IN SUDAN

Although this report does not specifically concern Black Rhinos *(Diceros bicornis)*, some recent information was collected on them for the IUCN/ AERSG.

They have been known to occur west of the Nile in Sudan (Molloiy, Mackenzie 1948), and reports from the Meshra area indicated that some may have occured there, while they were known from north west of Yirol in the Shambe region. The Inspector at Wau had received reports of black rhinos near the Boro river and north of Rumbeck, but the dates of these are not known. It is doubtful if any substantial numbers of black rhinos remain now west of the Nile.

Recent reports of them have been received from east of the Nile however:

There are a number of reports from the area of Lafon and Lokoro (east of Mongalla/Badingeru Game Reserve. The most recent sighting was a female and calf in 1979 (Sanchez T. p.c.) but signs have been reported since.

A female and calf were seen by locals and tracks seen by Game Scouts in Mongalla/Badingeru G.R. in 1981 . Spoor of a large lone male have been seen there by Game Scouts.

Two black rhino were seen at Gemeiza (north of Mongalla/Badingeru G.R.) in 1980 (Roger A. p.c.) and spoor have been seen more recently (Sudan Safaries)

Signs of black rhinos have been seen this and last season at Korun, a hunting concession south west of Boma National Park (Nile Safaries), and the southern part of the Park is reported to be suitable habitat (Snyder P. p.c.)

These rhinos will be of the sub-species *D.b.ladoensis*, which have been given high priority for conservation by the IUCN African Elephant and Rhino Groups. Both Mongalla/Badingeru and Boma are valuable areas. The former is close to Juba and is the centre for the Wildlife Training School and the focus for conservation education and tourist development in Southern Sudan. The latter has been under development by Frankfurt Zoological Society. Depending on the conservation future for Sudan, the possibilities of conserving these rhinos in a Game Reserve that has a number of other valuable factors and a good population of other species (see Appendix I) should add weight in considering priorities for spending conservation funds, either primarilly for the Reserve or for the black rhinos.

A skull was also recently found at a tributary of the Nile between Juba and Nimule, which indicates they have at least at some time occurred there.

UGANDA - MURCHISON FALLS NATIONAL PARK

The white rhinos of Murchison were not intended as part of the survey, since the area is fairly well covered anyway. However, the Park was visited, information gathered and a flight over the rhino area was kindly provided by Yank Evans.

The white rhinos that remain in the Park are the last in Uganda, and are the survivors of the 12 that were translocated into the Park in 1961 and 1964. They came from the west bank of the Nile, where it is believed none now remain.They had at one stage increased to 35 (Wheater R. pers.comm.) but during Amin's reign and the subsequent liberation war most were eliminated. One or possibly two remain. Reports from Park staff are that one white rhino remains and that it is generally in the company of a black rhino. This is a rather unusual situation if it is true. Dr Iain Douglas-Hamilton who has seen the rhino reports that it is a female. In a recent report in Swara (July/Aug 1983) the Director of Uganda National Parks, Mr P.Ssemwezi reports that there are two white rhinos at locations far apart in the Park.

Control of the poaching in the Park has been re-established with the help of the UNEP project, but two or even one are exceedingly low numbers. In order to re-build a population for Murchison Falls it would seem to be most advantageous to Uganda for the rhinos to be caught and temporarilly held with other northern white rhino in a captive or semi-captive state in order to increase the chances of breeding, until there were sufficient numbers to re-release them.

CENTRAL AFRICAN REPUBLIC

It was reported that in 1975 there were white rhinos in St Floris National Park in northern C.A.R. (Sanchez T. pers.comm.) . However reports from Spinage C. (1979/81 pers.comm.) indicate that they are probably gone, and that there has been no confirmation of any in eastern C.A.R.

However a report was received during this survey of a white rhino and calf having been seen twice in one season in 1981 at Golongossa Reserve, in the west of the country on the borders of the Shari and Auka rivers. There were also reported to be very many black rhinos there and very little poaching, except for meat. (Monteyro R. pers. comm.)

This should be followed up.

DISCUSSION OF THE 'DENSITY INDEX'

Since rhino signs in Sudan proved to be not only so sparse, but, in many cases so uncertain, the 'density-index' method was not pursued as fully as originally anticipated. However, a comparative look at the recording of rhino signs from areas of different white rhino density is quite instructive, and with more work this could be a useful method for an attempt at 'census' and monitoring of rhinos and other rare and endangered species.

The method is just a variation on the approaches, such as spoor and dung counts used by many biologists to'census' infrequently seen species. However, it was not so strictly controlled with regard to,for example,straight-line transects or counting only fresh dung, because to do so would have produced no results at all. It was controlled in that the same method was used in each area. Basically it just involved walking through an area, looking for signs of rhinos in the most likely places, ie tracks, waterholes, mud wallows, salt licks, rubbing places etc, and recording all signs per unit distance. Distances were measured using a pedometer and signs were also classified as fresh (within a few days) old (more than a week) and dubious (especially in the case of Sudan).

Signs noted and distances walked are given in the text for each area. For comparison, signs noted and distances walked are given for areas of known white rhino density : Garamba National Park, and different areas of Pilanesberg Game Reserve. The latter contains southern white rhinos, but it was necessary to use this as Garamba is the only place where there are relatively known densities of northern white rhinos. Local densities were used, obtained from counts (aerial and ground in Garamba, helicopter aerial in Pilanesberg). Data was taken from counts as close as possible to the times of walking. For comparative purposes data was used only from walks, not drives, since the ground coverage and sighting distances varied between the two methods.

There appears to be one difference between southern and northern white rhinos in respect of signs. The northern white rhinos in areas examined do not appear to make such large long term middens (termed here,'multiple use middens' MUM) as do the southern whites. This was also noted by van Gyseghem (1979) in his study of the white rhinos in Murchison Falls National Park. However, it may simply be related to density and the larger ranges and greater movement of the northen whites. They certainly do make short term middens since a few of these have been observed in Garamba, but we have seen nothing of the scale of the extensive middens made by southern whites. Van Gyseghem also postulated that there might be less territorial behaviour in the northern whites, or that in the case of his observations it was again due to low density and to there being only one 'alpha'male in the population.

The observations are summarised below into numbers of signs seen per 10km walked for each area.

Shambe

Unlikely rhino spoor	2.1
Unlikely dung	0.2
Possible scrape	0.2
Likely rhino spoor - old	0.2
Likely dung	0.2
Likely scrape	0.2
Rhino skeletons	0.9

Southern N.P.

Possible rhino spoor - old	0.5

Garamba National Park	*Local density 0.08rh/km²*
Possible rhino spoor - old	0.3
Possible dung - old	0.3
Rhino spoor - old	0.3
Rhino spoor - fresh	1.3
Scrape	0.3
Rhino skeletons	0.8
Rhino	0.3

Pilanesberg Game Reserve	*Local density 1.3rh/km²*
Rhino spoor - old	0.7
Rhino spoor - fresh	5.3
Dung	6.7
MUM+MSM (Mixed species midden)	10.0
Scrape	1.3

	Local density 2.8rh/km²
Rhino spoor - old	1.5
Rhino spoor - fresh	8.1
Dung	8.9
MUM+MSM	18.8
Scrape	2.3
Rhino skeletons	0.4
Rhino	1.9

These have been plotted on Fig. 1. Data points of known density are few but a relationship between the same type of sign at the different densities can clearly be seen. The problem comes in fitting points from the extremely low densities , particularly since the older the signs are, the more uncertain may be the identification.

Obviously, also, there will be differences in the visibility of both old and fresh spoor in different places influenced by soil type, grass cover, rainfall, numbers of other species etc. The lasting power of dung will be affected by rainfall, fire, dung beetle density etc. However, all measurements were taken in the dry season and doubtful signs were not used.

Figure 2 plots the log of the rhino signs that were recorded throughout all areas, against the log of known densities.
Regression lines have been fitted to the points and possible predicted densities for Shambe calculated on that basis. The dung, old spoor and scrapes indicate possible densities from 0.032 - 0.045 rhinos/km^2. It is difficult to know for sure, but somewhere in the region of 300 km^2 might still have had a chance of containing some rhinos. If these densities were true, it could mean anything from 9 to 14 rhinos at or shortly before the time of the survey were in the area. However there was so little firm data to be sure of that no firm conclusions can be drawn.

In using records of dung to plot regression lines, it was necessary to know how many defacations are present in the average midden at any one time, up to the age beyond which they would be unrecognisable if they were single defacations alone. This is not easy to tell, but of a sample of middens examined the average number of defacations estimated to fall into this category was just over 5. Five has therefore been used in plotting middens from the high density areas in conjunction with single dung.

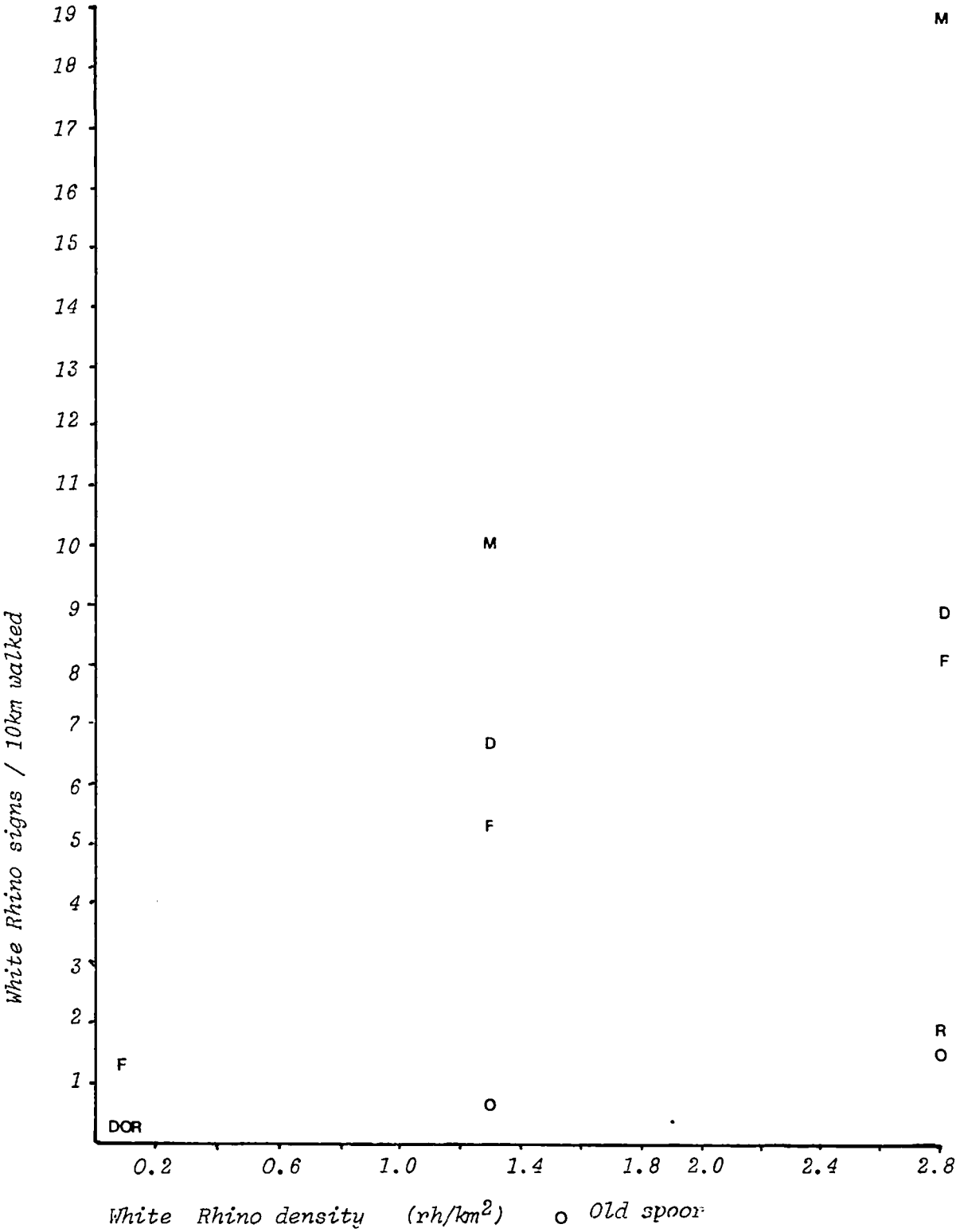


FIG 1

FREQUENCY OF RHINO SIGNS IN AREAS OF DIFFERENT RHINO DENSITY

Although there are many uncertainties and possible biases, especially at the extreme lower densities, the data plotted here have fitted closely along the regression lines and give very positive indications of the usefulness of the method. More work and data are needed to refine it, but this 'density index' approach appears to have some value in looking at (or for!) populations of rare or rarely seen species, such as rhinos.

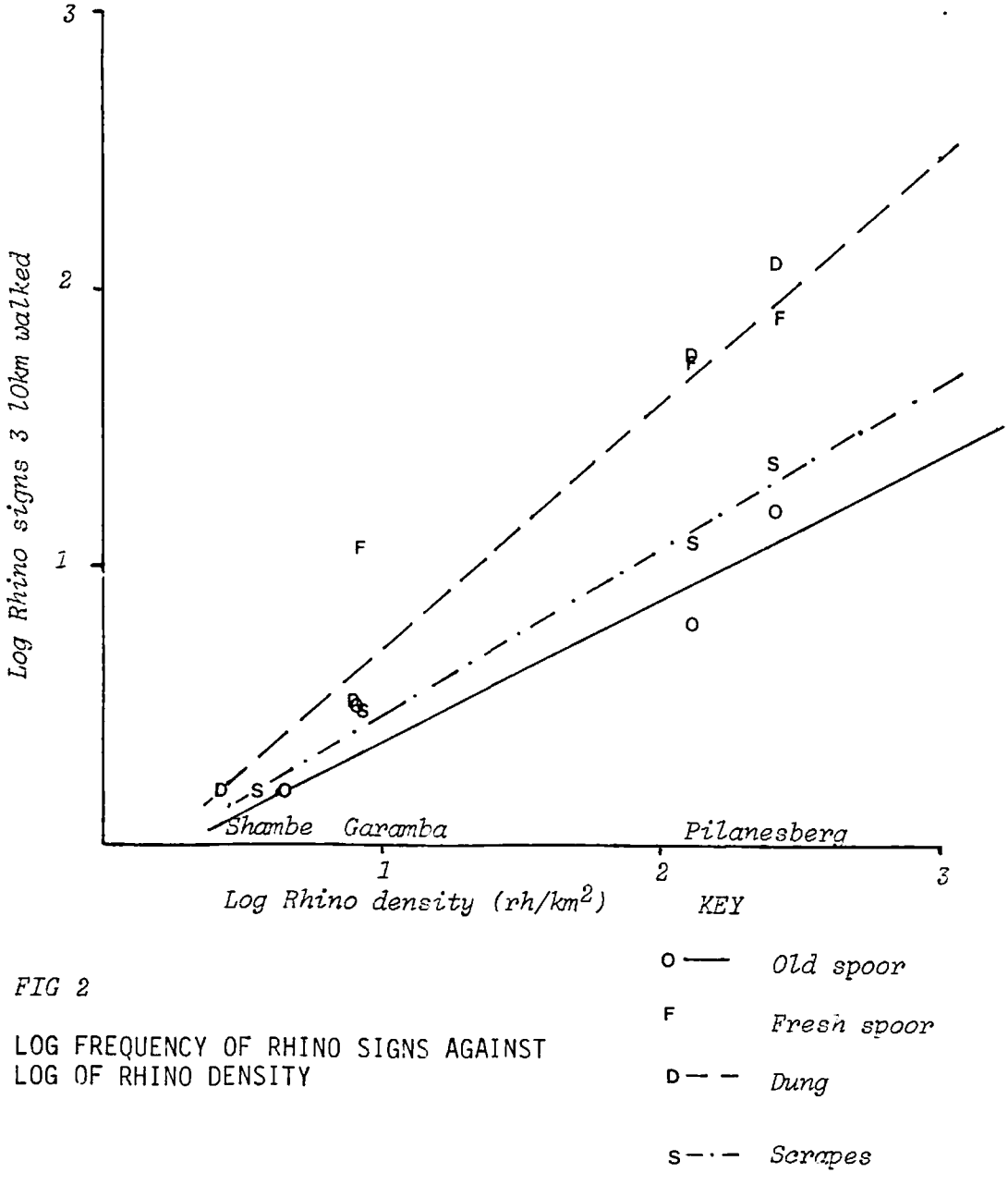


FIG 2

LOG FREQUENCY OF RHINO SIGNS AGAINST LOG OF RHINO DENSITY

COMPARATIVE FAUNAL VALUE OF THE AREAS EXAMINED

In considering conservation aid to certain areas, it is necessary, not only to evaluate their rhino populations, but also to examine the value of the ecosystems, in order to asign priorities. Within the constraints of surveying such large areas in a short time, the approach used was a simple one of recording individuals seen by species of animal, per measured distance travelled. This gives a comparable faunal value in terms of numbers and variety for the different areas, which is biased to some extent by the density of cover and hence sightability. It is a direct indicator of potential tourist value, where sightability is one of the integral factors. The results are related to the productivity and composition of the flora, though numbers are more closely related to the former and species to the latter. For example, the high numbers of animals were all obtained from grazing herbivores in a mainly grassland habitat.

Although it is therefore only an indicator, the method has proved useful. The data are presented in Appendix I and are summarised below for the different areas, in terms of numbers seen, numbers of species seen, numbers of animals per 10km travelled, and species numbers only where more than 10km was covered. The product of animals seen per 10km and species seen in 10 km or more is given as a comparative index of faunal value.

Location	Distance (km) Driven/Walked	Animals seen	Species seen	No.animals $10km^{-1}$	No.spp. in $\geq$ 10km	Faunal index
Alliab Dinka						
A Gwar R.	8/	3	2	3.8	-	-
AB Gwar & Waat	110/	49	6	4.5	6	27
B Waat R	91/	16	5	1.8	5	8.8
B Waat & tooich	80/	1118	10	139.7	10	1400
	Mean for Alliab area			*37.5*	*7*	*262.5*
Shambe region						
E Amereichir	55/1	-	-			
F Lerwot	/11	14	2	12.7	2	2.6
F Bei river	/4.6	219	2	476	-	-
F Forest	/3.2	6	3	18.6	-	-
G Katial pool	/10.2	153	2	153	2	30.6
H Ujur & Katiang	/23.8	139	11	57.9	11	637
J Karer-Jor	20/2	28	4	12.7	4	50.9
K -Nyrcircik pool	70/4.2	98	9	13.2	9	119
K Warjak-	/35	19	6	5.4	6	32.6
	Mean for Shambe area			*93.7*	*5.7*	*531.0*
Southern National Park						
M Boundary-J.A.	28/	13	4	4.6	4	18.6
M J.Angeleri	/21.2	15	5	7.1	5	35.4
M J.A.-Duri	15/	82	8	54.7	8	437
M Duri & Dokomoko	/4.8	3	1	6.3	-	-
	Mean for Southern National Park			*18.2*	*4.5*	*81.8*

Location	Distance (km) Driven/Walked	Animals seen	Species seen	No.animals 10 km^{-1}	No.spp. ⩾10km	Faunal index
Meshra region						
N Meshra p.G.R.	17/2	38	5	20	5	100
O Majak	/6	4	1	6.7	-	-
	Mean for Meshra region			*13.4*	*5*	*66.8*
Garamba National Park						
Eleti-Nauoloko	/14	78	4	55.7	4	222.9
Source "	/10	103	6	103	6	618
Eleti	/1.5	60	4	400	-	-
Eleti	/13	252	6	193.9	6	1163
Eleti	/6.5	98	6	57.7	-	-
Nambira	/11.5	417	6	362.6	6	2175.7
Nambira-Naguga	21/	259	5	123.3	5	616.7
Nagero-Gangala	63/	275	12	43.7	12	523.8
	Mean for Garamba N.P.			*167.5*	*6.5*	*1088.8*
Murchison Falls National Park						
N.gate-Paraa	40/	516	8	129	8	1032
	Mean for Murchison N.P.			*129*	*8*	*1032*
Mongalla/Badingeru G.R						
Badingeru pan	30/	2533	12	844	12	10132
	Mean for Mongalla/Badingeru			*844*	*12*	*10132*
Pilanesberg Game Reserve						
E.B.Dam-K.Kraal	/4	6	3	15	-	-
L.Ruighoek	/8.9	55	4	61.8	-	-
N.basin	/9.8	17	6	17.4	6	104
Lepalana-Ram.l.m.	/15	4	3	2.7	3	8
Syringa Valley	/8.5	21	5	24.7	-	-
	Mean for Pilanesberg G.R			*24.3*	*4.5*	*109.4*

Corrections have not been made for mean sighting distance in the different regions. Most are comparable, except Pilanesberg Game Reserve, which has a higher density of bush cover, and parts of Southern National Park. Times of day travelled were comparable. Sighting distances were greater in the grassland areas, and it was generally in these that highest local concentrations of animals were found. The figures from Monagalla-Badingeru Game Reserve are biased because they are from only one sample, which included the pan where many animals were concentrated. In terms of assessing potential tourist value, these factors are an integral part, but in terms of ecological value, they do provide some biases. Nevertheless, bearing these things in mind the results do reflect our evaluations of the areas, evaluations, which of course, included assessing other factors as well.

It can be seen, for example,that Garamba National Park rates high in the faunal index, very similar to Murchison Falls National Park, with which it shares a similar habitat. The Shambe area has a reasonable rating, but Meshra is low. The rating for Southern National Park is also rather low. We only covered a part of this large Park, but it was probably reasonably representative, since Southern has never been known as a high density area. Its value lay in being a large reservior of representative habitat and wildlife, while it has, as is reflected in the figures in Appendix I, been hard hit by poaching.

Pilanesberg was recorded only because it is an area of known white rhino density that was being used as a control in the density-index approach.The low sighting distance for live animals will have less effect on the finding of rhino signs. The figures for live animals are included merely for interest.

NORTHERN WHITE RHINOS IN CAPTIVITY.

The current situation

Northern white rhinos are down to such low numbers that it is necessary to consider all individuals that are known if the sub-species is to be saved. It is at the stage where ensuring a captive breeding population is needed as a back up to wild conservation to ensure sub-species survival. At the Wankie meeting of the IUCN African Rhino and Elephant Groups in 1981, the conservation priorities for northern white rhinos were outlined as:
a) Strengthening the captive "herd" of northern white rhinos by centralising those already held into a viable and productive breeding unit.
b) Strengthening the captive "herd" by capture and translocation of a few animals from the wild .
c) Putting the greatest effort into securing the safety of the white rhinos in Garamba national park, which has the greatest biological and conservation value of their remaining habitat and is an existing National Park.
d) Cost effective action to secure the future of a viable population unit of northern white rhinos in Southern Sudan.

The situation for northern white rhinos in captivity was therefore also examined.

Lindemann (1981) with a slight modification from the white rhino studbook (Klös 1981) lists 17 in captivity. On investigation, however, 12 can be accounted for with certainty, the whereabouts of another 4 are uncertain, and others are reported possibly to exist at Riyadh and Tel Aviv, but have not yet been confirmed. The last of the previously listed 17 died in 1982.

The 12 are as follows:

Studbook number	Sex	Date and place of birth	Location held	Date of arrival	Name
16	f	1948 Sudan	Antwerp	7.4.1950	
19	m	1950 Sudan	London	25.7.1955	Ben
74	m	1952 Sudan	San Diego	2.8.1972	
347or348?	m	? Sudan	Khartoum	4.1970 or 3.1973?	
372	m	1973 Sudan	Dvur Kralove	13.10.1975	Sudan
373	m	1972 Sudan	" "	"	Sauti
374	f	1974 Sudan	" "	"	Nola
376	f	1972 Sudan	" "	"	Nadi
377	f	1972 Sudan	" "	"	Nesari
378	f	1969 Uganda	" "	27.8.1977	Nasima
476	f	11.11.77 Dvur Kralove	" "	11.11.1977	Nasi
630	m	8.6.80 Dvur Kralove	" "	8.6.1980	Suni

Four were listed in the studbook as at Khartoum, but only one is there at present. The others may have been transferred, but have quite possibly died. A female number 351 originating from Uganda was listed as at Prescot, Prescot say she was sent to Dvur Kralove, but she has not been received there, and has as yet not been traced. Female number 375 was at Dvur Kralove but died in an accident in 1982.Female number 476, born at Dvur Kralove is believed to be of mixed *C.s.simum* and *C.s.cottoni* parentage, because her mother was pregnant on arrival, and subsequent morphological and chromosome characteristics indicate so.

Female 378, the mother of the two born at Dvur Kralove is due to calve again in November or December. The females 374 and 377 were mated by the bull 372 in June 1983 and it is hoped they are pregnant. The sire of the calf to be born later this year is the bull 372, but the sire of the one born in 1980 was 373. The zoo is managing the rhinos to minimise in-breeding.

The group at Vychodoceska Zoo at Dvur Kralove in Czechoslovakia is therefore the only known breeding group. All those from Sudan were caught at Shambe. The zoo gives high priority to the rhinos. In 1984 they will be given more space in a 'safari' area, currently under construction, and this may improve breeding further. They also have excellent laboratory, veterinary and research facilities and the head of the reproductive laboratory, Dr Josef Safarik is working on both improving the breeding of the rhinos and on developing the specific techniques and information for artificial insemination of the northern white rhinos, that can then be more widely applied.

Possibilities for improvement

In August 1982, the International Union of Directors of Zoological Gardens held a meeting at the London Zoo (to which Hillman was invited) to examine the status of rhino in captivity and the wild and to dicuss plans for improving captive breeding of rhinos. Zoo facilities are limited and in general Asian rhinos, which are fewer, take priority over African. However,

it was agreed that the northern white rhinos were sufficiently different and in such a precarious state that zoos would co-operate, where necessary in improving their captive breeding, especially since, in practice it would not detract from any other rhino breeding programmes. Facilities were offered on ranchlands in th USA, and have also been offered on ranches in Africa. It was agreed that if any northern white rhinos (or other rhino species) were to be kept on ranches in USA the programme would be overseen by the American Association of Zoo Parks and Aquariums (AAZPA).

A number of guidelines are available. Lindemann found that although there are over 500 southern white rhinos in captivity only 61 of them are contributing to the breeding pool (known as the effective population or N_e). This is often due to keeping them as singletons or pairs, or even, where they are in groups, to having only one dominant male in the group for long periods. Frankel and Soulé (1981) state that having equal numbers of males and females in the N_e minimises loss of heterozygosity. This is not always possible in practice however. In the wild, southern white rhinos, at least are territorial for mating, (Owen - Smith , 1974) and if kept closely confined, dominant males will fight, especially over a resource like oestrus females. Zoos can therefore often keep only one adult male at a time with females unless others are very subordinate. It would therefore seem to be genetically valuable to change the male with females at intervals to give others a chance to breed, or perhaps better, to divide the females between the males and have them adjacent but physically separated. Lindemann also found that the physical presence of another male may stimulate breeding in one, hence the suggestion that they are adjacent. In the case of northern white rhinos, the presence of a southern white male nearby could possibly have the same effect where numbers are very limited. Further, she found that a change in individuals may stimulate animals to breed that previously had not. If females were put in groups with males it would therefore be advisable to move them around occasionally. Single pairs of male and female white rhinos do not breed well in captivity. Many of these criteria are already being followed at Dvur Kralove, together with hormone stimulation, ith greater space, temporary sub-division of the group between males may also be possible.

The Captive Breeding Specialist Group of the IUCN recommends that where possible captive breeding of rare or endangered species should be in at least two breeding units. An immediate need to improve the captive breeding of northern white rhinos would therefore appear to be to consolidate remaining singletons in captivity or animals that have no possible immediate future in the wild into a breeding unit. In view of the low numbers, it would also be important to have exchange of animals or genetic material with those at Dvur Kralove, from time to time. Officials with whom I talked at Dvur Kralove agree to co-operate in this.

Three of the known remaining singletons in captivity are probably too old to be worth the trauma of moving to join a breeding group, although the male in San Diego could probably join a group if it was in the USA (as agreed by the Director). It would be important for the survival of the sub-species, for the animal in Khartoum to be put with others. Continued efforts are needed to trace the others possibly already in captivity. Other than that, one has to look back to the wild. Clearly, where there is any chance of conserving populations in the wild within their natural habitats and with other components of valuable ecosystems, this must be more important than capture or translocation. Where there is little or no hope for some individuals in the wild, however, it would seem to be of advantage to the country concerned to amalgamate what animals remain in an adequately protected environment designed to maximise potential breeding, so that populations can re-built and be re-introduced to the wild.

Where such a group would be held is open to question. The ideal would be in

one of the countries where the rhinos are indigenous. However, the fact that they are already almost extinct lends some doubt to the possibilities of adequate long term protection, unless there is considerable input to do so. Such input might actually cost less than moving them elsewhere. Nevertheless, any action may depend on the availability and sources of funds.

Secondly , if they could be held at least nearby, there would be less expense, trauma and danger of moving them, more chance of relatively natural conditions and it would facilitate subsequent re-introductions. Again, this would depend on the parties concerned.

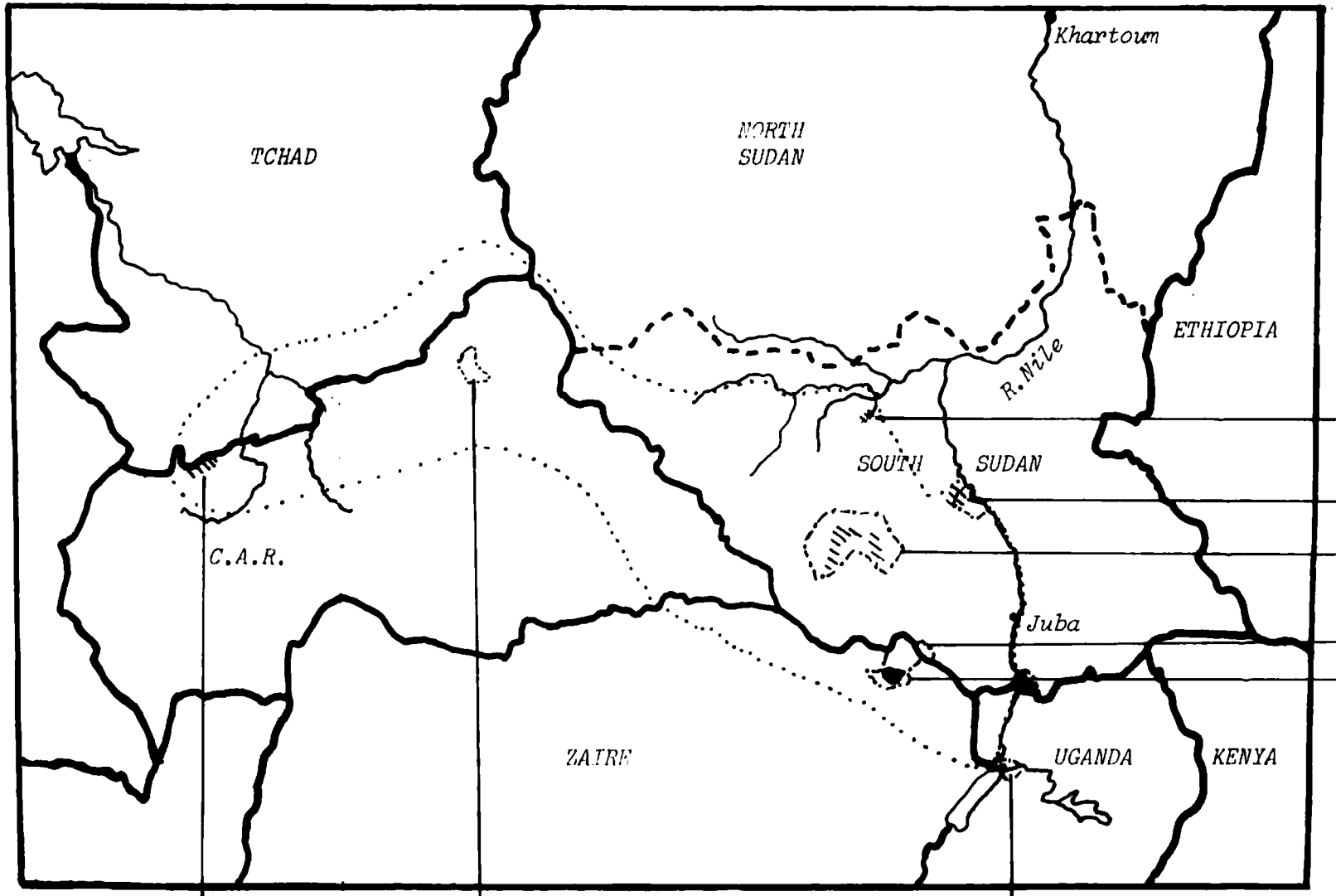
Thirdly would be to establish a second breeding group outside Africa. If this was to be agreed to, it would be most important that the rhinos remained the properties of their countries of origin, with a view to re-introduction when they had re-built numbers, and that simultaneously there was aid given to in situ conservation. Rhinos are only part of the conservation priorities within these countries, and they badly need help. In Sudan, there is also the possibility that some rhinos may survive in situ if some help is given to improving the protection of parts of Shambe and Southern National Park, where remoteness has so far been some saving grace.

Of the rhinos known in the wild with limited hopes for the future:
In Uganda, protection has been improved. However with numbers down to one or possibly two, they are likely to go extinct unless kept temporarilly with others. In Sudan, some could survive due to remoteness, but to guarantee a future population of white rhinos for the country, efforts should be made to catch a few indiviuals and protect them in a viable unit. The situation in Central African Republic needs investigation.

The above are obviously only suggestions, to be considered and hopefully acted upon by the parties concerned. If anything is to be achieved, however, action is urgent.

MAP 3

PRESENT AND PAST KNOWN RANGE OF NORTHERN WHITE RHINOS (1983)



KEY

-Approx. limits of ranges, end 19th century

-Virtually certain occurence. V.low density.

-Proven occurence

-Parks/Reserves mentioned in text

Meshra

Shambe

Southern N.P.

Lantoto

P.N.de la Garamba

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. Very few Northern White Rhinos remain now in the wild. The total world population is probably less than 100, possibly considerably less.
At least 13-20, possibly more are at Garamba National Park in Zaire.
One or 2 remain at Murchison Falls National Park in Uganda.
Some almost certainly still remain in the Shambe area, particularly in the north west, but at a very low density.
Some almost certainly remain in Southern National Park, but again at a very low density and severely threatened by next season's poaching.
A few individuals probably still remain in the Meshra area, but with little or no future possibilities there.
There may still be a population, possibly even a reasonable one in the Golongossa hunting reserve in western C.A.R., but this must be further investigated.
There may well be other relict populations scattered around, but we know of nothing substantial. There could especially be further hopes in C.A.R., but none of these countries are easy places to search for or find rhinos.
There are 12 definitely known in captivity, with the strong possibility of a few more, that are being investigated.

2.Of all the remaining range of the northern white rhinos, Garamba National Park offers the most viable possibility known for conservation of a population in the wild. At least 13-20, possibly more were estimated to be there in March, within less than 500km^2 of the Park, in the southern sector. It is a World Heritage Site, with a high'faunal value', nearly 8000 elephants, over 50,000 buffalo and a variety of other species. It has a well established infrastructure, though run down in resources and operation, with staff of over 200. Recent heavy rhino poaching there appears to have been from 1977 to about 1979/80, but elephant poaching continues.

3.Of the few rhinos that remain in Sudan, there is no longer any certainty that a viable population remains anywhere, or that due to the political and resource state of the country, such a population could successfully be conserved in situ at present or with a long term future. Two areas are of considerable value, however, both for the possibility of white rhinos and for their values as an ecosystem or as a reservoir. These are Shambe and Southern National Park. Of value for the possibility of black rhinos, *(D.b.ladoensis)* and numerous and varied populations of other wildlife, and considerable educational possibilities, is Mongalla-Badingeru proposed National Park.

4.In Shambe proposed National Park and adjacent areas,there are almost certainly some northern white rhinos at least in the area north-west of the Yirol-Shambe road,, but heavy poaching over the last 3 years has removed most of what had been there. There are now insufficient rhinos to justify a major expenditure of rhino funds there specifically for the conservation of northern white rhinos. However, it is a valuable area, with a good 'faunal value', an ecosystem not conserved elsewhere, a good senior wildlife officer, and a possibility that some rhinos could remain through a combination of remoteness of certain areas and aid to conservation. At minimum the intermediate assistance agreed to in 1981 must go there (Motor bike for senior officer, solar panels and batteries for radios, bicycles and some fuel on a one-to one basis with the Ministry) and it will be put to productive use.

5.It is recommended that the proposed Park area be given official conservation status, as, initially Game Reserve in the south east, with a compromise worked for use by the local people, but as possibly National Park with exclusive wildlife and no human use in the area north west. It is recommended

that the best long term possibilities for the area under present circumstances would be development jointly with giving long term non-hunting tourist development rights to an effective and motivated safari company backed by good principles (with particular consideration of Nile Safaries who are developing operations in the area). A reciprocal agreement would need to be worked out, and the company would need to contribute towards anti-poaching. Specific conservation aid should be considered if required, within this context, if results justify it.

6. Some rhinos almost certainly still remain in Southern National Park, but they are severely threatened by next season's poaching. In view of the losses from Shambe, this Park would have provided the best reservoir of northern white rhinos in Sudan had it not been for the recent severe poaching there, particularly from the north. In view of the Italian development plans for the Park, the possibilities of their assistance to combat this over-riding threat should be investigated.

7. In view of the over-riding seriousness of the poaching in Southern Sudan, particularly the recent northern invasion it is suggested that a consortium of international help is needed, both at the diplomatic level and to help develop and effective, organised field system, with resources, mainatinance and personnel, as well as the overall planning 'advisor' previously suggested. The 'advisor' it is felt,should be funded by other than rhino funds, since the possibility of other funds is likely, and to give greater objectivity and support, as well as leaving rhino funds for more specifically rhino matters, such as in field conservation, capture, and anti-poaching.

8. In the Meshra area there appear still to be the odd individuals. This is not however an area of high priority or value for conservation in situ and is being 'hunted' out by poachers from Wau. If action was taken quickly , in conjunction with such a move elsewhere, it is possible that one or two rhinos could be caught and moved to safer holding.

9. Lantoto South proposed National Park does not contain any rhinos, nor is it likely to in the immediate future, partly for habitat reasons. In March it did not contain many other species either, but did have some of the less common forest ones, such as red-flanked duiker and red river hog. It has little agricultural potential, is on a watershed and borders part of Garamba National Park. The Park and Lantoto together would form a broad spectrum of habitat types, and there is currently good co-operation between guards across the border. If there can be sufficient back up and supervision of guards it would be valuable to give it official conservation status. Less first hand information is available for Lantoto north, but second hand information indicates that there would be less value in giving this area Park status, and it could cause conflict with people.

10. Members of the Wildlife Dept. of the Southern Region have suggested the need to catch a few remaining northern white rhinos and give them better protection, at least as a temporary measure. This would not be an easy operation and difficult to justify for only one of the areas covered. However, in view of the possibilities for all three areas, the desparate state of the northern white rhinos in the world and the lack of much hope for any conservation of them in the wild in Sudan at present, it is suggested that if outside aid can be given, particularly to aerial support and at least in Southern National Park with a helicopter, this is an urgent priority. It would require intensive ground work simultaneous with preparation of logistics, and in conjunction with local people.

11. In Murchison Falls National Park in Uganda, one white rhino is known

to exist and another possibly. It is suggested that the best hope for re-building a population for Uganda would be to put them temporarilly with other northern white rhino, that are either relict individuals, or singletons from zoos in a protected state conducive to breeding from which animals could be re-introduced when numbers had re-built.

12. A population of northern white rhinos possibly exists at Gologossa in C.A.R and should be further investigated.

13. Twelve northern white rhinos are known in captivity and others are possible and being further investigated. The only known breeding group in captivity is that at Vychodoceska Zoo at Dvur Kralove in Czechoslovakia, where there are 8, shortly to be 9 and possibly 2 more females pregnant. Holding conditions are being expanded and research and veterinary work being carried out.

14. If it was possible and agreed to,a second breeding group should be established somewhere, amalgamating the male from Khartoum, possibly the male from San Diego, any others that can be found and any that are caught from places where they have no future at present in the wild. Animals within such a group should be only on loan from their countries and there should be agreements on re-introduction possibilities, and if it involves wild situations,on reciprocal conservation aid. Because numbers of the sub-species are so low there would need to be exchange of breeding animals or genetic material with the Dvur Kralove group at times, if genetic heterozygosity was to be maximised.

15. Development of techniques of semen collection, artificial insemination, and embryo transplant would be valuable for the maintainance of the sub-species.

16. Priority must clearly be given to conservation in the wild wherever possible, because this has far wider reaching importance than just for rhinos. If the northern white rhinos are to survive, however(in the way that the southern whites were rescued from near extinction) , there must be simultaneous action both for their conservation in the wild, and conservation of their habitats, and also for insurance back up of viable breeding units in captive or semi-captive conditions. It will require considerable international co-operation and this is requested.

It is suggested that the priority actions are:

1. Conservation action for the rhinos in Garamba in the context of re-development of functional conservation in the Park and of other aspects of the ecosystem, with close monitoring on the progress of such, and contingency plans.

2. The 'intermediate'aid to Shambe and further aid to anti-poaching and/or rhino cpature in Sudan as seen fit.

3. Negotiation of the possibility of catching some rhinos in Sudan for temporary improved protection.

4, Negotiation of the possibilities.of forming a second breeding nucleus by amalgamating singletons and others with no future.

5. Investigation of the situation in C.A.R.

6. Consideration of aid for the group at Dvur Kralove if required.

This is a report to IUCN/WWF. It does not necessarilly express official IUCN/WWF or IUCN AERSG policy.

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APPENDIX I

WILDLIFE SEEN ON WALKS AND DRIVES IN DIFFERENT AREAS AS A COMPARATIVE INDEX OF THE FAUNAL VALUE AND TOURIST VIEWING VALUE

Dry season 1983

Alliab Dinka, Sudan

Location	Habitat	Driven/Walked	Species	Numbers
A Gwar River	TBS-D	8km/	Bushbuck	1
			Duiker	2
			Elephant	Many signs
AB Gwar area & Waat R.	TBS-M/D	110km/	Bushbuck	15
			Duiker	2
			Reedbuck	20
			Leopard	1
			Ostrich	3
			Roan	8
			Elephant, giraffe & Buffalo	Many signs
B. Waat & Gel R.	Acacia TBS -M BCS &TBS	91km/	Bushbuck	9
			Duiker	1
			Oribi	3
			Ostrich	2
			Egyptian cobra	1
			Elephant & Giraffe	Fresh spoor
B Waat R. & tooich grassland	TBS -M GS	80km/	Bushbuck	9
			Oribi	19
			Roan	5
			Ostrich	3
			Giraffe	4
			Waterbuck	1
			Reedbuck	3-400
			Kob	250-300
			Tiang	4-500
			Lions	2
Shambe proposed N.P. and immediate surrounds, Sudan				
E. Amereichir	TBS-M WS	55km/1km	Giraffe & Buffalo	Spoor
F Lerwot forest	WS -M GS	/11km	Tiang	13
			Warthog	1
F Bei river	GS	/4.6km	Tiang	200
			Kob	19
			Elephant & Hippo	Many spoor
F Forest inland from Lerwot	WS-M/D	/3.2km	Giraffe	2,1
			Bushbuck	1
			Warthog	2
			Buffalo skel.	3
G Katial pool & woodland	WS-M/D GS	/10.2km	Giraffe	3
			Tiang	150
			Buffalo skel.	1
			Waterbuck "	1
			Gazelle "	1

Location	Habitat	Driven/Walked	Species	Numbers
H Ujur & Katiang pool	WS-O TBS-O GS	/23.8km	Oribi Roan Tiang Giraffe Buffalo Ostrich Warthog Waterbuck Kob Lechwe Bushbuck Giraffe skel. Buffalo skel. Elephant skel.	1,2,1,1,1, =6 2,4,6 =12 3,2,6,5, =16 1,1,2,18 =22 50-70 2,2,2, =6 1 8 2,2 =4 2 2 4 1 1
	(Kob, Tiang & Lechwe in GS)			
J Karer-Jor-Pakeng	TBS-O GS	20km/2km	Oribi Giraffe Tiang Lions Elephant & buffalo Spoor Giraffe skel. Roan skel	1 2,2 =4 20 3 2 (1killed by lions) 1
K Pagarau-Nyrcircik pool-Tiengau	TBS-M TS-O	70km/4.2km	Oribi Giraffe Roan Buffalo Tiang Hartebeeste Warthog Ostrich Lion	1,3,1, =5 3,1,1,1,1,1,1,3,2=14 10,6,1 =17 1 1,8,1,6,6,1,4=27 1,2,2,11,8,2 =26 1,1 =2 1,1,1,2 =5 1
K Warjak pool-Pagarau	TBS-M	/35km	Giraffe Roan Hartebeeste Reedbuck Tiang Waterbuck	1,1 =2 6 1 3 5 2
K Warjak & Nyrcircik Pools	Watched 30.30hrs & 3 nights checked		Giraffe Roan Buffalo Tiang Hartebeeste Leopard Baboons Patas monkeys Elephants Buffalo Lions Jackal Warthog	1, 2 150 3,1,1,12 =17 8,4,15 =27 1 2,2 =4 At night " " " 2,5 =7

Southern National Park

Location	Habitat	Driven/Walked	Species	Numbers
M Southern N.P. boundary - Jebel Angeleri	WS - D TS - D TBS	28km/	Oribi Reedbuck Buffalo Hartebeeste Duiker Elephant skel Buff.skel.	1 1 7 1,2 =3 1 1 (>2yr)-poached) 1 (<1yr)-disease)
M S.N.P. nr Jebel Angeleri	TBS-M BS -M water points. Veg.dry	/21.2km	Reedbuck Warthog Bushbuck R-f.duiker Vervets Buff.skel Ele.skel. Poachers camp	3,2 =5 1,4, =5 2 1 3 (<1yr-disease) 3 (>2yr,>1yr, 1-2yrpoachec 1 (Croc.& Elephant)
M S.N.P. J.Angeleri-Duri R.	TBS-D WS -M/D Green flush	15km/	Reedbuck Buffalo Hartebeeste; Grey duiker Warthog Bushbuck Giraffe Baboons Ele.Skel	2 1,±30,3,±30 =64 1 1,1 =2 3 1,2 =3 2 3 (>2yrs) (1 young still with small ivory)
M S.N.P. Duri & Dukomoko R.	BS -M Water	/4.8km	Reedbuck Buff.skel Ele.skel. Warthog skel. Hartebeeste skel. Poachers camps	2,1 =3 4 (<1yr- disease) 1 (>3yrs) 1 (<1yr) 1 (<6mths) 2 (Croc. & fish)

Meshra proposed Game Reserve and environs

N Meshra p. G.R. - Meshra a'Req -Loldin	BCS TBS-M WS -M GS Water at Meshra	17km/2km	Grey duiker Oribi Giraffe Ostriches Reedbuck Elephant spoor (old)	2,1 =3 2,3,1,1 =7 1,5,4,1 =11 2,3 =5 12
O Forest nr Majak	WS -M TBS-D Waterin Amoko R.	/6km	Grey duiker Giraffe spoor Antelope spoor	4

Garamba National Park

Location	Habitat	Driven/Walked	Species	Numbers
Eleti - Nauoloko Rivers & return	GS Riv.W	/14km	Reedbuck	1,1 =2
			Buffalo	5,32,9 =46
			Elephant	10,2,3,9,3 =27
			Lions	3
			Ele.skel.	3 (<3yrs)
Source Nauoloko & round	"	/10km	Oribi	2
			Reedbuck	2,2,1, =5
			Buffalo	2,1,1,2,2,1,2 =11
			Elephant	2,7,12,3,2,10,2,2, 3,3,8,2,3,7,3,8, =77
			Hartebeeste	3
			Hyaena	2
Eleti R.	GS Swamp	/1.45km	Reedbuck	2
			Buffalo	50
			Elephants	7
			Rhino	1
			Ele.skel.	1 (<4yrs)
Eleti R.	"	/13km	Reedbuck	1,1
			Buffalo	3,1,40,2,40, 114,20,4,2=226
			Elephant	10,4,4,4,7,4,1,4,1, =39
			Oribi	1
			Hartebeeste	3
			Warthog	3,1 =4
Eleti R.	"	/6.5km	Reedbuck	2
			Buffalo	1,1,2, =4
			Elephant	8,5,6,6,7,8,7,5,15,5=72
			Hartebeeste	1,7,5 =13
			Kob	2,
			Warthog	1,4 =5
Nambira source west,south & round	GS Riv W Swamp	/11.5km	Reedbuck	1
			Oribi	1,1,2,2,2,2 =10
			Buffalo	2,±200,5,±150,2,1 =360
			Elephant	2,5,7 =14
			Hartebeeste	3,17,12,
			Banded mongoose group	
Nambira -Naguga	GS TS-O Riv.W	21km/	Reedbuck	2
			Buffalo	2,10,24 = 36
			Elephant	6,43,20,10,4,10,10,8, 9,4,7,12,5,4,14,13,3, 4,5,3,8,4, =203
			Hartebeeste	7,4,4 =15
			Warthog	3
Nagero -Gangala	GS BS Riv.W	63km/	Oribi	1,3 =4
			Buffalo	20,2,4,1,4,100 =131
			Elephant	5,3,6,9,2,2,1,3,9,1=41
			Kob	30,2,4 =36
			Reedbuck	3
			Hartebeeste	4,10,3,1,4,2,2,17 =43
			Warthog	1,2 =3
			Roan	1
			Giraffe	2
			Hippos	3

Location	Habitat	Driven/Walked	Species	Numbers
Nagero-Gangala cont'd			Waterbuck	2,1 =3
			Baboons	troop
For comparison:				
Murchison Falls National Park, Uganda				
North Gate-Paraa	GS BS - O	40km/	Reedbuck	2,3, =5
			Buffalo	±60,±150,8,2,8,1,2 =231
			Elephant	±70,5, =75
			Hartebeeste	2,7,3,3,8,12,3,20,10 5,2,1,1,2,2,1 =82
			Oribi	3,2,4,3,3,2,3,3,3,1,5, 1,2,2,1,1,2,1,1 =43
			Kob	1,1,1,1,1,1,31,15,10,=62
			Warthog	1,9,7, =17
			Lion	1
Mongalla-Badingeru G.R., Sudan				
Boundary - Badingeru pan	BS - M/O GS TBS-M/O	30km/	Reedbuck	150
			Oribi	26
			Hartebeeste	18
			Kob	6
			Warthog	8
			Zebra	±200
			Mongalla gazelle	70
			Tiang	±2000
			Ostrich	45
			Eland	4
			Roan	3
			Duiker	3
Pilanesberg G.R., Bophutatswana				
Elephant boma dam - K.Kraal V.	BS-D/O	/4km	Kudu	1
			Bushbuck	1
			Elephant signs	
			Rhino(White)	4
Lower Ruighoek Valley	BS GS	/8.9km	Impala.	1
			Hartebeeste	1, ±20 =21
			Wildebeeste	±30
			Rhino (White)	1,2 =3
Northern basin	BS-D/O	/9.8km	Kudu	1
			Impala	1,2 =3
			Wildebeeste	9,1 =10
			Warthog	1
			Giraffe	1
			Duiker	1
Lepalana V. -Ramatshabale Mao	BS-D/O GS	/15km	Bushbuck	1
			Hare	1
			Kudu	2
Syringa Valley	Riv.W BS-O/D	/8.5km	Zebra	10
			Wildebeeste	1
			Reedbuck	6,1 =7
			Bushbuck	2
			Rhino 1	1 (Ad.male)

APPENDIX Ii RHINO SIGNS IN AREAS OF KNOWN RHINO DENSITY, FOR COMPARISON

Garamba National Park

Location	*Rhino density*	Habitat	Driven/Walked	Rhino signs
Eleti-Nauoloko R & rtn.	*0.08/km²*	GS Riv.W.	/14km	-Possible spoor -Old femur (>3yrs) -Possible dung -Lower jaw (>3yrs)
Source Nauoloko & round	"	"	/10km	-Old spoor -Fresh spoor (20x21cm)
Eletir R.	"	GS Swamp	/1.45	-Rhino 1 (Adult male)
Eleti R.	"	"	/13km	-Fresh spoor 4 -Scrape 1 -Rhino skel. 2 (> 3yrs)
Eleti R.	"	"	/6.5km	-
Nambira source	*C.05/km²*	GS	/11.5km	-Fresh spoor
Nagero-Gangala	"	GS TS BS	63km/	-Fresh spoor 1 -WRM (Midden) 2 -Scrape 1
Pilanesberg G.R.				
Elephant boma dam - K.Kraal	*2.8/km² (White rhino only)*	BS-D/O	/4km	-Fresh spoor 14 -Old spoor 3 -White rhino midden (WRM) 10 -Mixed species midden (White & black)(MSM) 6 -Scrape 2 -Rhino 4
Lower Ruighoek Valley	"	BS GS	/8.9km	-Fresh spoor 11 -Old spoor - -WRM 10 -White rhino dung (WRD) 4 -Scrape 3 -Rhino 3
Northern basin	"	BS	/9.8km	-Fresh spoor 2 -Old spoor - -WRM 2 -MSM 11 -Scrape 3 -Rhino 4
Lepalana V-Ramatshaba le Mao		BS-D/O GS	/15km	-Fresh spoor 8 -Old spoor 1 -WRM 10 -MSM 5 -WRD 10 -Scrape 2

Location	*Rhino density*	Habitat	Driven/Walked	Rhino signs	
Syringa Valley	*2.8/km²*	Riv.W BS-O/D	/8,5km	-Fresh spoor -Old spoor -WRM -MSM -WRD -Scrape -Rhino skel -Rhino	5 1 18 2 18 1 1 1

APPENDIX II

CHECKLIST OF BIRDS SEEN IN SOUTHERN SUDAN

(January - April 1983)

Compiled by Kes Hillman, Fraser Smith & Tim Wood.

Ref: J.G.Williams & N.Arlott, *A Field Guide to the Birds of East Africa* Collins, London

LOC indicates the location in which the bird has been seen.
1 : Southern National Park (east)
2 : Shambe-Alliab Dinka areas
3 : Tonj-Meshra areas
4 : Other areas.

COMMON NAME	SPECIFIC NAME	LOC
Ostrich	*Struthio camelus*	3
White Pelican	*Pelecanus onocrotalus*	4
Cattle Egret	*Ardeola ibis*	1,2,3,4
Grey Heron	*Ardea cinerea*	2
Great White Egret	*Egretta alba*	2
Little Egret	*Egretta garzetta*	1
Yellow-billed Egret	*Egretta intermedia*	2
Black-necked Heron	*Ardea melanocephala*	1
Squacco Heron	*Ardeola ralloides*	2
Hammerkop	*Scopus umbretta*	1,2
Sacred Ibis	*Threskiornis aethiopicus*	1,2
Hadeda Ibis	*Hagedashia hagedash*	2
African Spoonbill	*Platalea alba*	2
Marabou Stork	*Leptoptilus crumeniferus*	2
Yellow-billed Stork	*Ibis ibis*	2
Woolly-necked Stork	*Ciconia episcopus*	2
Saddlebill Stork	*Ephippiorhynchus senegalensis*	2
Openbill Stork	*Anastomas lamelligerus*	2
Sudan Crowned Crane	*Balearica pavonina*	2,3
Spurwing Goose	*Plectopterus gambensis*	2
Fulvous Tree Duck	*Dendrocygna bicolor*	2
White-faced Tree Duck	*Dendrocygna viduata*	2
Garganey Teal	*Anas querquedula*	2
Knob-billed Duck	*Sarkidiornis melanotos*	1,2
Secretary Bird	*Saggitarius serpentarius*	1,2
Fox Kestrel	*Falco alopex*	4
African Fish Eagle	*Haliaeetus vocifer*	1,2
Bateleur	*Terathopius ecaudatus*	1,2
Black Kite	*Milvus migrans*	1,2,3,4
Long-crested Eagle	*Lophaetus occipitalis*	2
Augur Buzzard	*Buteo rufofuscus*	1
Grasshopper Buzzard	*Butatstar rufipennis*	1,2
Tawny Eagle	*Aquila rapax*	1
Hooded Vulture	*Necrosyrtes monachus*	2,3
Ruppell's Vulture	*Gyps ruppellii*	4
Gabar Goshawk	*Melierax gabar*	2
Pale Chanting Goshawk	*Melierax poliopterus*	1,2
Dark Chanting Goshawk	*Melierax metabates*	2,3

COMMON NAME	SPECIFIC NAME	LOC
Black-shouldered Kite	*Elanus caeruleus*	2
Black-chested Harrier Eagle	*Circaetus pectoralis*	1
Helmeted Guinea-fowl	*Numida meleagris*	1,2
Yellow-necked Spurfowl	*Francolinus leucoscepus*	4
Crested Francolin	*Francolinus sephaena*	1,2
Heuglin's Francolin	*Francloinus icterorhynchus*	1
Clapperton's Francolin	*Francolinus clappertoni*	3
Black-bellied Bustard	*Eupodotis ruficrista*	2,3
Wattled Plover	*Vanellus senegalus*	1,4
Black-winged Stilt	*Himantopus himantopus*	1,2
Blackhead Plover	*Vanellus tectus*	3
Spur-winged Plover	*Vanellus spinosus*	2
Long-toed Lapwing	*Vanellus crassirostris*	2
Painted Snipe	*Rostratula benghalensis*	2
Egyptian Plover	*Pluvianus aegyptius*	2,3
Pratincole	*Glareola pratincola*	2
Bronze-winged Courser	*Rhinoptilus chalcopterus*	2
Dunlin	*Calidris alpina*	2
Common Sandpiper	*Tringa hypoleucos*	1,2
Senegal Stone Curlew	*Burhinus senegalensis*	1
Spotted Stone Curlew	*Burhinus capensis*	2
Water Dikkop	*Burhinus vermiculatus*	2
Namaqua Dove	*Oena capensis*	2,3
Laughing Dove	*Streptopelia senegalensis*	1
Mourning Dove	*Streptopelia decipiens*	2
Black-bellied Wood Dove	*Turtur afer*	1
Ring-necked Dove	*Streptopelia capicola*	1,2,3
Bruce's Green Pigeon	*Treron waalia*	3
Speckled Pigeon	*Columba guinea*	2
Senegal Coucal	*Centropus senegalensis*	1,2
White-browed Coucal	*Centropus superciliosus*	2
Speckled Mousebird	*Colius striatus*	1,2,4
White-bellied Go-Away Bird	*Corythaixoides leucogaster*	4
Eastern Grey Plantain Eater	*Crinifer zonurus*	2,4
White-crested Turaco	*Tauraco leucolophus*	1
Green Wood Hoopoe	*Phoeniculus purpureus*	1,2
Abyssinian Scimitarbill	*Phoeniculus minor*	2
African Hoopoe	*Upupa epops africana*	1,2
Brown Parrot	*Poicephalus meyeri*	3
Rose-ringed Parakeet	*Psittacula krameri*	3
Abyssinian Roller	*Coracias abyssinica*	1
Broad-billed Roller	*Eurystomus glaucurus*	1
European Roller	*Coracias garrulus*	2
Striped Kingfisher	*Halcyon chelicuti*	1
Grey-headed Kingfisher	*Halcyon leucocephala*	1,2
Pygmy Kingfisher	*Ispidina picta*	1
Red-throated Bee-eater	*Merops bulocki*	1
Carmine Bee-eater	*Merops nubicus*	1,2,3
Little Bee-eater	*Merops pusillus*	1,2
Blue-cheeked Bee-eater	*Merops persicus*	2
Little Green Bee-eater	*Merops orientalis*	2

COMMON NAME	SPECIFIC NAME	LOC
Little Swift	*Apus affinis*	2
Palm Swift	*Cypsiurus parvus*	1,2
White-rumped Swift	*Apus caffer*	2
Grey Hornbill	*Tockus nasutus*	1,2
Abyssinian Ground Hornbill	*Bucorvus abyssinicus*	1,2
Red-billed Hornbill	*Tockus erythrorhynchus*	3
Jackson's Hornbill	*Tockus jacksoni*	4
Spotted Eagle Owl	*Bubo africanus*	2
Freckled Nightjar	*Caprimulgus tristigma*	4
Standard-winged Nightjar	*Macrodipteryx longipennis*	2,3
Pennant-winged Nightjar	*Macrodipteryx vexillarius*	2,3
Donaldson-Smith's Nightjar	*Caprimulgus donaldsoni*	1
Brown-breasted Barbet	*Lybius melanopterus*	1
D'Arnaud's Barbet	*Trachyphonus darnaudii*	2
Greater Honeyguide	*Indicator indicator*	2,3
Cardinal Woodpecker	*Dendropicos fuscescens*	1,2
Bearded Woodpecker	*Thripias namaquus*	1
Yellow Wagtail	*Motacilla flava*	2
African Pied Wagtail	*Motacilla aguimp*	1,2
Chestnut-headed Sparrow Lark	*Erenopterix signata*	3
Woodchat Shrike	*Lanius senator*	3
Grey-backed Fiscal	*Lanius excubitorius*	2,3
Black-headed Gonolek	*Laniarius erythrogaster*	2,3
Tropical Boubou	*Laniarius ferrugineus*	1
Black-headed Tchagra	*Tchagra senegala*	3
Sand Martin	*Riparia paludicola*	2
European Swallow	*Hirundo rustica*	2
Arrow-marked Babbler	*Turdoides jardinei*	1
Yellow-vented Bulbul	*Pyconotus barabatus*	1,2
Northern Brownbul	*Phyllastrephus strepitans*	1
Sooty Chat	*Myrmecocichla nigra*	1,2
Snowy-headed Robin Chat	*Cossypha niveicapilla*	2
Kurrichane Thrush	*Turdus libonyanus*	1
Silverbird	*Empidornis semipartitus*	2
Grey Flycatcher	*Bradornis microrhynchus*	1
Paradise Flycatcher (normal & white phases)	*Terpsiphone viridis*	1,2
Red-faced Apalis	*Apalis rufifrons*	2
Tawny-flanked Prinia	*Prinia subflava*	1
Crombec	*Sylvietta brachyura*	3
Pygmy Long-tailed Sunbird	*Antheptes platura*	2
Beautiful Sunbird	*Nectarinia pulchella*	3
Fork-tailed Drongo	*Dicrurus adsimilis*	2
Square-tailed Drongo	*Dicrurus ludwigii*	1
Red-cheeked Cordon-bleu	*Uraeginthus bengalis*	1,2
Brown Twinspot	*Clytospora monteiri*	2
Crimson-rumped Waxbill	*Estrilda rhodopyga*	4
Fawn-breasted Waxbill	*Estrilda paudicola*	1
Common Waxbill	*Estrilda astrild*	2
Red-billed Firefinch	*Lagonosticta senegala*	1

COMMON NAME	SPECIFIC NAME	LOC
White-rumped Seedeater	*Serinus atrogularis*	3
Streaky Seedeater	*Serinus striolatus*	2
Cabanis's Yellow Bunting	*Emberiza flaviventris*	1
Chestnut-crowned Sparrow Weaver	*Plocepasser superciliosus*	2
White-browed Sparrow Weaver	*Plocopasser mahali*	4
Grey-headed Social Weaver	*Pseudonigrita arnaudii*	2
Red-billed Quelea	*Quelea quelea*	2
White-headed Buffalo Weaver	*Dinemellia dinemelli*	2
Speckle-fronted Weaver	*Sporopipes frontalis*	2
Superb Starling	*Spreo superbus*	4
Ruppell's Long-tailed Starling	*Lamprotornis purpuropterus*	1,3,4,
Red-billed Oxpecker	*Buphagus erythrorhynchus*	2,3
Yellow-billed Oxpecker	*Buphagus africanus*	2
Golden Oriole	*Oriolus auratus*	1
European Golden Oriole	*Oriolus oriolus*	1
Piapiac	*Ptilastomus afer*	2,3