

Report to: IUCN/WWF and the Ministry of Wildlife
Conservation and Tourism, Southern
Region, Sudan

AN AERIAL RECONNAISSANCE
OF THE SHAMBE AREA,
SOUTHERN SUDAN
22 - 26th April 1981

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M.Sommerlatte





June 1981


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WWF (Netherlands)

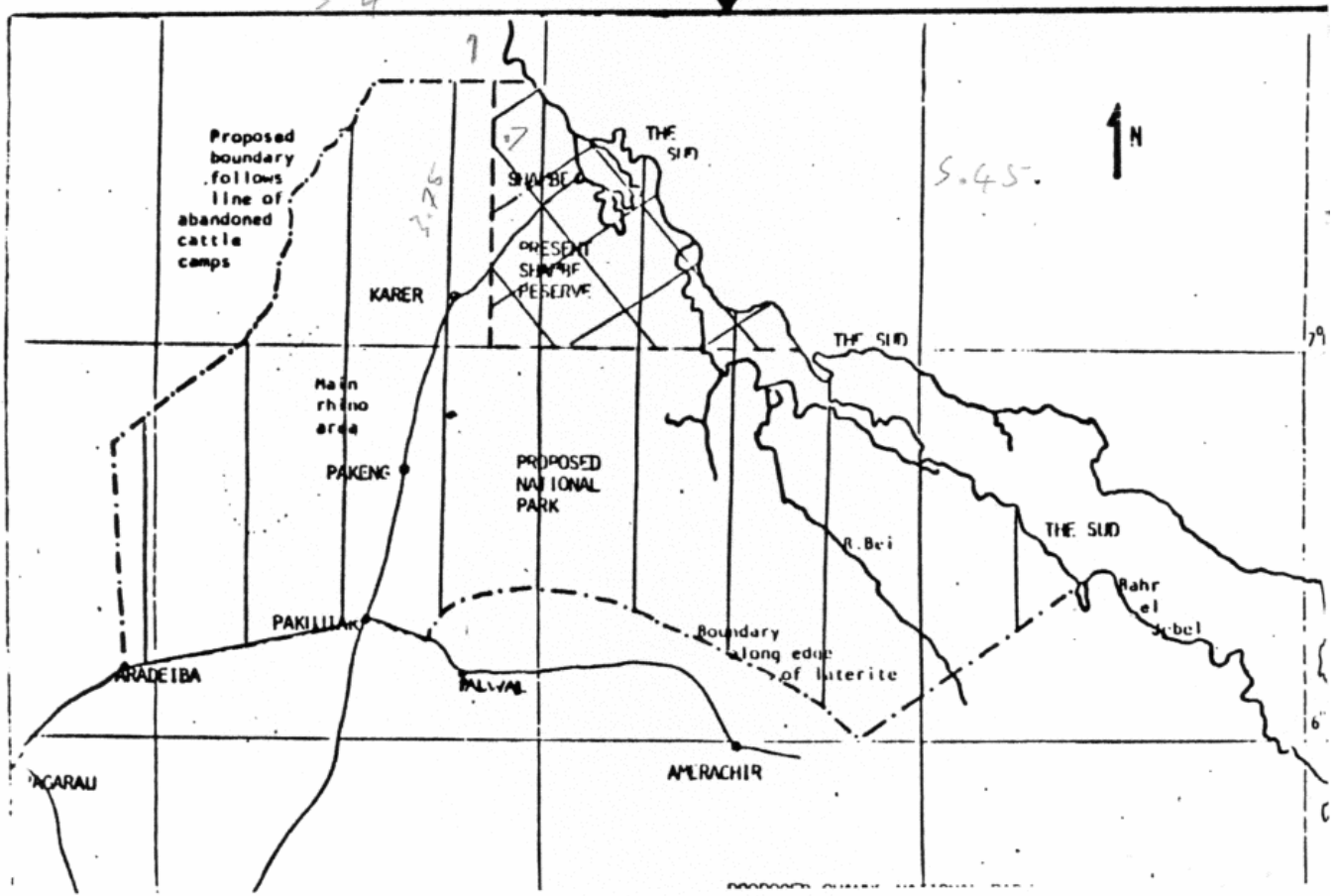
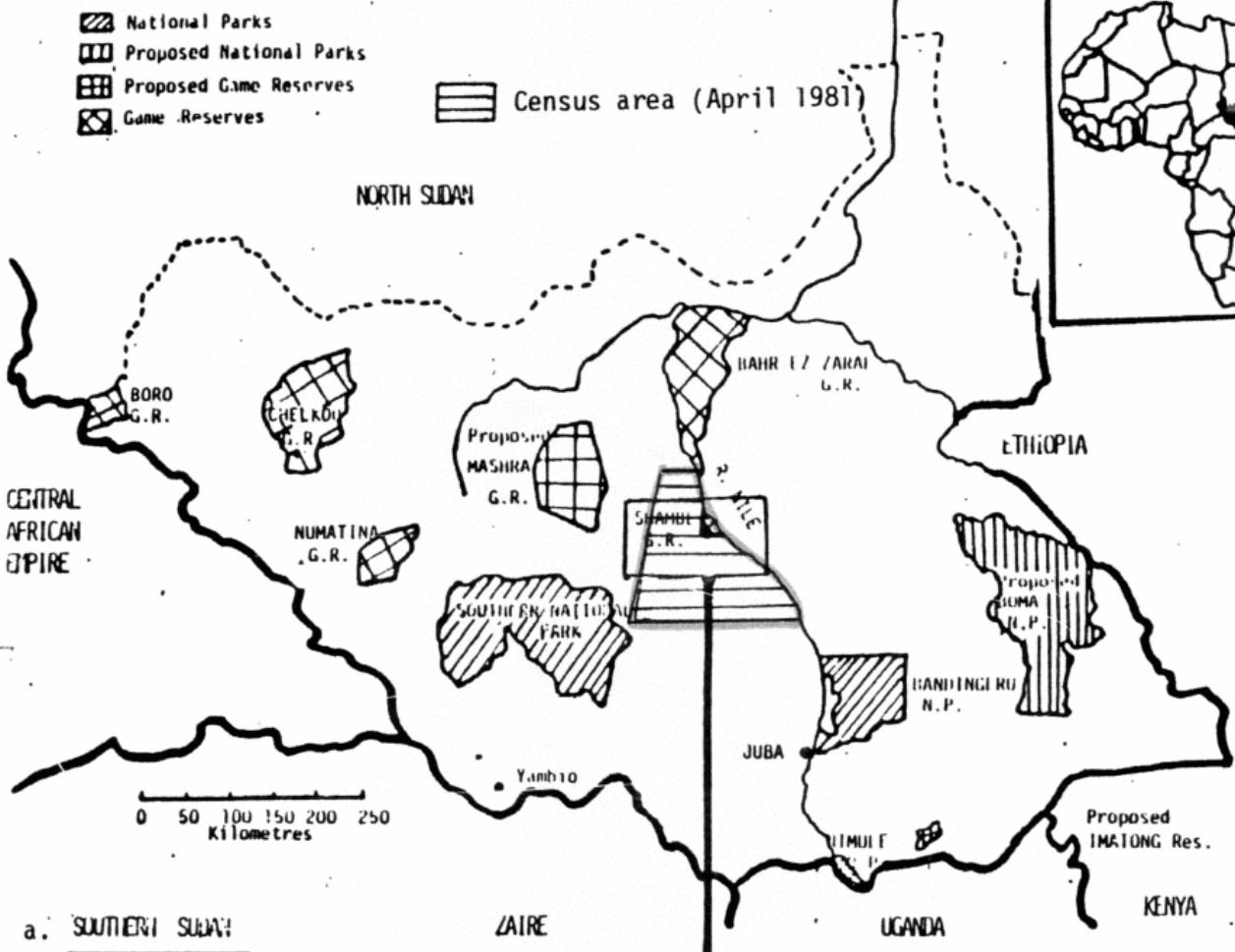
ACKNOWLEDGEMENTS

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A.K.K.H. and P.M.S.

-  National Parks
-  Proposed National Parks
-  Proposed Game Reserves
-  Game Reserves

 Census area (April 1981)



INTRODUCTION

The Northern White Rhino (*Ceratotherium simum cottoni*) is the most endangered of all the African rhinos. The results of the IUCN/NYZS/WWF Rhino survey and conservation project indicated that there may be less than 1000 left in the wild, of which possibly the majority occur in Southern Sudan.

The Regional Ministry of Wildlife Conservation and Tourism, Southern Sudan and Peter McClinton (Frankfurt Zoological Society) in conjunction with the IUCN African Rhino Group put forward a project to establish a National Park whose primary objective was conservation of White Rhinos, in a region adjacent to and encompassing the existing 166km² Shambe Reserve. This reserve had been established in 1938 for the conservation of White Rhinos and Mrs Gray's Nile Lechwe.

Rhinos had been reported to occur in the locality by Sydney in 1938. In 1976 Blower in his report to FAO emphasised the importance of the area, and in 1976 Chipperfield caught II there. They were currently reported to be inland of the Reserve due to pressures of expanding human settlement around Shambe port, when expansion of the reserve and gazettelement of a park was proposed. Hillman (JC), Western and McClinton saw 5 in a short flight over the area in 1979; and Hillman (AKK), Grimwood, Tong and McClinton saw 5 in 20 minutes flying over the area in February 1980.

More detailed reconnaissance was felt to be necessary before finalisation of the project, since the area proposed for the Park did not appear to be a complete ecosystem. A proposal for studies provide information for management over a much wider area with particular reference to the rhinos and to elephants was also proposed. A ground reconnaissance attempt by Hillman and Grimwood in May 1980 failed due to the start of heavy rains and lack of time. (It was limited instead to investigations of the Northern White Rhino in Zaire.) In November 1980 a joint ground/aerial reconnaissance of the area was planned by Hillman and P.M. Snyder, who was interested in becoming project officer. Unserviceability of the aircraft 5Y-KEZ in Maridi, Sudan curtailed the aerial aspects. Ground reconnaissance was however made in conjunction with Caputo and Baker. The results are reported in Hillman and Snyder, November 1980 and indicated among other things aspects of the human/wildlife relationship in the area and problems likely to be encountered in its development.

In April 1981, at the end of the dry season, a systematic aerial census and series of general reconnaissance flights over the area were therefore carried out by Hillman, Snyder, Somerlatte, Baker and Baba. Results are reported here. The results were immediately used in negotiations on the establishment of the project and development of a protocol agreement with the Ministry and John Kundaeli, IUCN Regional Officer for Africa (Kundaeli 1981).

DESCRIPTION OF THE AREA

The systematic reconnaissance flights (SRF) were carried out over 15,200 km² on the left bank of the Bahr el Jebel Nile, as indicated on maps 1 and 2. Detailed reconnaissance flights were carried out over the area proposed as a park and its immediate surroundings.

Topography

The majority of the area is flat. Between Shambe and Yirol only 20' change in ground level was recorded by the aircraft pressure altimeter. To the south, a series of granite ridges running north/south become more prominent. A low lying seasonally flooded plain of "black cotton" soil stretches 40-60 km inland from the river in the region of the proposed park, to a slightly higher laterite plateau.

METHODS

The area of the proposed National Park and a considerably larger adjacent area to north, south and west, designed to encompass a variety of habitat types and to give an indication of the wildlife and human land use, was surveyed from the air by two approaches:

- a) General reconnaissance flying over areas of interest, particularly the proposed park and boundaries, with staff from the Ministry of Wildlife Conservation and Tourism, Southern Sudan, local Wildlife Department Officers and the aerial observers.
- b) Systematic reconnaissance flights to survey 15,200 km² by sample transect census, (Norton-Griffiths 1978).

a) and b) were carried out by:

Aircraft:	Cessna 185 5Y-A01 Owned by AWLF
Pilot:	P.M. Snyder
Front seat observer:	A.K.K. Hillman
Rear seat observers:	M. Sommerlatte T. Tear

Observers and advisors from Ministry of Wildlife Conservation:

J. Baba
G. Gilgiri
J. Biem
Luke

a) General reconnaissance flights were as follows:

24.4.81 P.M.S., A.K.K.H., T.T. and J. Baba
07.20 - 10.15 Juba - Yiol via survey of Shambe area
11.55-13.35 Yiol - Juba over Adior
24.4.81 P.M.S., A.K.K.H., G. Gilgiri and J. Biem
17.45-18.27 . General recce.
25.4.81 P.M.S., A.K.K.H., G.G., and Luke
17.15-18.15 Recce of "rhino area".
27.4.81 P.M.S., A.K.K.H., M.S., T.T.
07.25-08.25 Intensive recce over "rhino area".

TABLE ISummary of Parameters of Systematic Sample Count

Area:	15,200 km ²
Sampling intensity:	3%
Transects:	east/west; 12 on 155 km base line
Census period:	a.m. 24 and 25 April 1981
Season:	late dry season
Aircraft:	Cessna 185 5Y-AOT
Pilot:	P.M. Snyder
Front seat observer (Habitat parameters):	A.K.K. Hillman
Rear seat observers (Animal census):	Left - T. Tear Right - M. Sommerlatte
Strip width, total:	414m Left - 217m Right - 212m
Height a.g.l.:	300'
Flying speed (average):	169kph
Total counting time:	414 mins.

Water

The Nile and swamp provide abundant surface water close to the river. Surface water is available within 10 km on the toich grassland, but in the dry season there is little or no surface water in the woodland. 70-80 km is the maximum distance between river systems throughout the area. Mean annual rainfall recorded between 1950 and 54 at Shambe (Mefit Babti, 1980) is 670mm. It falls largely in one long dry season from April/May to October/November.

Vegetation

The river is lined with papyrus (*Typha*) swamp, grading into "toich" grassland on the flood plain (*Hypparhenia* and *Oryza*). Patches of *Acacia* savannah woodland occur, but the laterite plateau is largely *Terminalia/Combretum* woodland. Flat plains of toich grassland border the rivers inland from the Nile and the seasonally fluctuating lakes which are also vital areas for wildlife grazers and cattle.

There appears from the air to be very little palatable grass cover in the woodland in the dry season. In November at the end of the wet season, ground observation indicated that the grass in the woodland was relatively sparse and rank. At that time the majority of the grass in the grassland areas was coarse and very tall.

Like most of Southern Sudan the area is subject to extremes of rainfall and vegetation cover. During the wet season much of the grasslands and some of the woodlands are flooded. Movement is limited and most roads were built up on causeways in the past. During the wet season the grass grows up to 20' high. Throughout the dry season virtually all of it burns off, filling the air with a continual smoke haze, but occasional brief rains give rise to short grass flushes. Such extremes of climate and grass availability probably limit the carrying capacities of such areas.

THE PEOPLE

The majority of the area is the country of the tall, fascinating Aliab Dinka, with Nuer in the northern tip of the survey area. The two are separated by a no-mans land which forms the northern part of the proposed park. The Rhinos appeared at one time to be concentrating there in the non-populated area.

The Dinka are basically semi-nomadic pastoralists with beautiful long-horned 'Ankole' cattle which are of overwhelming importance to them. They also practice some agriculture (mainly growing dura) and fishing. Semi-permanent fishing camps are scattered along the edge of the river. Small agricultural settlements consisting both of village units and of mosaics of fields each with a house on stilts ('alwel') in the centre are located mainly along the edge of the laterite plateau, and in scattered water-linked locations north and south of the proposed park. Their situation, particularly on the laterite edge between the toich and woodland, has been a constraining factor on the location of the originally proposed boundaries. These are thus set to the river side of the line of the plateau and include almost no *Terminalia/Combretum* woodland. Although virtually uninhabited by wildlife or people in the dry season, it is reported by hunters that wildlife, particularly rhinos and elephants use the woodlands in the wet season. During the dry season the Dinka cattle are grazed on the "toiches" both close to the Nile and along the smaller rivers. They are based at this time in temporary cattle camps where an all embracing cover of soft white smoke and ash imparts both protection and a wierd ghostliness. These grasslands are also the areas used by the majority of the wild herbivores at the same time. The grazing rights are very important to the Dinka and would not be relinquished easily.

In the past hunting by the Dinka was apparently limited to defense and they carry spears at all times, but hunting by the local people would appear to be on the increase

Licensed hunting through safari companies is a valuable earner of foreign exchange for

- b) The SRF census was carried out by straight line transects approximately 10 km apart, flown east/west across the catena between the river and the inland plateaus. ONC-L5, 1:1,000,000 and survey of Khartoum I:250,000,78E(1946) maps were used. Methods were as outlined in Norton-Griffiths (1978) and parameters are summarised in Table I. Height was maintained and recorded using the pressure altimeter which was calibrated on the airstrip at Yirol and frequently between transects by flying at ground level. No radar altimeter was available at the time, but the area is basically flat, with only 20' difference recorded between Yirol and river-level.

A relatively wide strip width was used, since in this preliminary survey it was considered that maximisation of variety was more important than increasing the numerical accuracy. A 4% sample was aimed at. However, Sudan is notorious for difficult flying, with strong winds, magnetic errors and few navigation points and it was found that a strong southerly drift was experienced despite correction. Many of the transects were thus spaced more widely than 10 km and in covering the area with only 12 transects in this way, sample intensity was reduced to 3%. But as noted in Jolly and Watson 1979 minor errors in random location transects are not important.

Strip widths were demarcated by rods on the struts spaced according to formula (Norton Griffiths 1978) to obtain approximate 200m at 300ft. Exact calibrations were obtained by repeated flights over a series 20m spaced markers on the airstrip at varying recorded heights with observers a) counting and b) photographing the markers between the rods.

Rear seat observers counted animals by species seen within transect, settlements and other observations where relevant, using tape recorders. Photographs were taken where herds were too large to count at the time. Low flights were made prior to the census to check species identification.

The front seat observer recorded habitat parameters: tree, bush, grass cover and greenness, burn and flush, water availability and type or human settlement as percentages of the whole area observable each minute, together with vegetation type and height a.g.l. These observations were then averaged for each 10 km sub unit, using flying speed per transect to relate minutes to distance.

Animal numbers were analysed using Jolly (2) in a Texas Instruments 59 desk calculator. (Jolly 1969)

RESULTS

- 1) General observations are brought out in the discussion. The most striking observations from the general reconnaissance flights were lack of sightings of any live rhinos despite intensive searching at the ideal times of day (early morning and evening) and instead the observation of large numbers of rhino, elephant, giraffe, cattle and other skeletons, particularly near roads. On an hour's flight in early morning over the area north and west of Karer where live rhino were always observed in the past, 7 skeletons positively identified as rhino were seen and others of elephant, giraffe and cattle.
- 2) Animal numbers and confidence limits of the estimates are given in Table 2. Densities and distributions of main wildlife species of domestic cattle and shoats (sheep and goats) and of skeletons are mapped (maps 4-17). Habitat parameters and human habitations are mapped (maps 18-31).

SHAMBE Late dry season (April 1981)

POPULATION ESTIMATES

SPECIES	ESTIMATE	STANDARD ERROR
Elephants (<i>Loxodonta africana</i>)	829	429
Roan antelope (<i>Hippotragus equinus</i>)	1514	678
Buffalo (<i>Syncerus caffer</i>)	3686	1437
Tiang (<i>Damaliscus corriganus</i>)	21573	9067
Reedbuck (<i>Redunca redunca cottoni</i>)	7058	3717
Giraffe (<i>Giraffa camelopardalis c.</i>)	3429	985
Kob (<i>Kobus kob leucotis</i>)	16401	7431
Waterbuck (<i>Kobus defassa</i>)	3086	2611
Lechwe (<i>Kobus megaceros</i>)	1372	1405
Cattle	124552	35538
Shoats	10458	3912
Oribi (<i>Ourebia ourebia</i>)	200	126
Duiker (<i>Cephalophus grimmia</i> ?)	372	120
Wart hog (<i>Phacochoerus aethiopicus</i>)	629	230
Hartebeeste (<i>Alcelaphus buselaphus lilwei</i>)	1714	1230
Baboon (<i>Papio</i> sp)	686	504
Ostrich (<i>Struthio camelus</i>)	257	240
Rhino skeleton (<i>Ceratotherium simum cottoni</i>)	57	42
Elephant skeleton	257	189
Unidentified skeleton	714	243
Ratio live : dead elephants	3 : 1	

DISCUSSION

The results of this aerial reconnaissance backed up by earlier considerations of the area and the ground reconnaissance in November 1980 indicated the following:

1. Large numbers of wild herbivores occur in the region surveyed (e.g. 23,000 tiang, 21,000 kob, 8,000 reed buck, 4,300 buffalo, 4,000 Nubian giraffe, 1,000 elephants, often in spectacular herds in attractive grasslands. In the late dry season most were on the toich grasslands and adjacent sparsely wooded grasslands.
2. Domestic stock (particularly cattle) occur in approximately equal numbers to the total wildlife population (90,000), and were also in the toich grasslands at the time of the census.
3. No live rhinos were observed on the census or recces. In April or November two definitely identified dead rhinos and two possibles and 13 or 15 unidentified skeletons were seen during the census. In an intensive recce over the area where rhinos were plentiful a year ago, 7 skeletons positively identified as rhino were counted in one hour. Many were fresh and most are probably from this dry season since there was no evidence of them seen in February 1980 and the effects of serial floods and fires each year must tend to weather skeletons rapidly (Douglas-Hamilton and Hillman 1977). This does not however mean that there are no live rhinos. They are extremely difficult to count from the air. 25 live rhinos were reported to have been seen by the Vice President in March this year in the grasslands north of the proposed park boundary. In June 1981 poaching of rhinos was reported to have started in Southern National Park (Ministry of Wildlife Conservation and Tourism, pers. com.).
4. Elephants occur in the proposed area, particularly in the swamps, but also move inland and their location and behaviour near Yirol indicates conflict with agricultural settlements.
5. The area proposed as a park or sanctuary is not a complete ecosystem for any of the species that use it (except possibly Nile Lechwe). The aerial survey was done at the end of the dry season when wildlife should if anything be most concentrated in the grasslands which form the major part of the park. The greatest wildlife and domestic stock biomasses were in the toich grasslands as opposed to the woodlands but the heaviest concentrations of grazing wildlife were in the grasslands in Nuer country beyond the northern boundary of the proposed park. Reports indicate that the higher woodland areas outside the proposed park are used in the wet season.
6. There is a reasonable diversity of habitat types within the proposed park, but it does not represent all the major types in the region, nor does it contain any of the higher laterite plateau which may be important habitat in the wet season.
7. Bird life is very spectacular and varied.
8. People use the proposed park area seasonally, with cattle camps, livestock grazing and fishing camps. There are significant human settlements at Shambe and Karer, but no agricultural settlements within the proposed park area itself. The Shambe/Yirol road is being developed by the Ministry of Transport and Communications to redevelop Shambe port.

9. Poaching is widespread and out of control there at present and arms are readily available. Very little respect for the wildlife laws is shown, and the wildlife officers feel very constrained by lack of fuel and equipment.
10. Licenced hunting is an important factor in the area and has a major part to play in the development of the conservation and management wildlife resource in the whole of Southern Sudan. The safari companies have a vested interest in both ethical hunting and in promoting adjacent conservation if they have a major long term investment, since this is what assures them a continued supply of game. As of June it is also reported that long term concessions will come into force which may enable greater commitment to positive, conservation-orientated use of their areas.
11. The area does have considerable wildlife resources and there is an urgent need for conservation and management measures, but these must be sensitive to the needs and attitudes of the people. It may be possible to move out most of the human settlement if the area is gazetted and this is under negotiation. The area proposed as a park, by itself is unlikely to achieve the objective of conserving rhinos or indeed many other species. A much larger area must be controlled, as well, in management zones, and a very much larger area, including the proposed Mashra Game Reserve needs investigation to identify possible rhino populations. There are two major objectives in this project:
 - a. Conservation of the Northern White Rhino.
 - b. Conservation and management of the area and of the fauna and flora.
 Both need to be considered in its implementation.
12. Tourist development will be difficult mainly due to the lack of suitable facilities and beurocratic orientation within the southern region as a whole. But in the context of this developing, there is a potential for a variety of "different" approaches e.g. river based, elephant back, aerial or swamp buggy, "old fashioned" pioneer walking as well as driving viewing.

RECOMMENDATIONS

1. Immediate development of a strong conservation force and effective control of poaching by support, training, motivation and leadership for the personnel, physical establishment of a presence and law enforcement.
2. Detailed investigation of the rhino situation. The reces have emphasised the need for the proposed research project which should also include more investigations of the rhino situation in the whole southern region.
3. The main area should be gazetted as soon as possible in order to establish a legal right, but in doing so and in negotiations, the motivating reason for creating the northern boundary just south of the Dinka/Nuer boundary should be ~~reconsidered~~. The following additions to the park area are suggested for consideration:
 - a. An extension to the north of the present proposed boundary.
 - b. Some woodland area, even if only initially with a corridor when a wet season distribution pattern has been obtained.
4. Investigation of a much larger area, identification of other rhino areas for conservation, and of other important species and habitat conservation needs there.

5. Development and implementation of a management plan for a complex of conservation and management zones.
6. The project officer should work closely with the Ministry Headquarters and be involved where required on the overall development of the infrastructure in the Southern Region, since conservation and management in Shambe can only work in the overall development context.
7. Co-operation and communication with, clarification of the wildlife laws and general conservation education of the local people.
8. Communication and co-operation with the hunting companies with interests in the area to develop management plans of tourism.
9. Initiation of research projects in conjunction with the University of Juba.

Immediate practical suggestions discussed with the Ministry for achieving the first stages of 1 and 2 above prior to full initiation of the project were:

IUCN/WWF	Solar generators for installation of VHF and HF SSB radio. 6 bicycles for game scouts. Motorbike for Senior Wildlife Officer. Provision of fuel on a one-to-one drum basis with the Ministry.
Ministry	Demarcating boundaries, particularly with signboards. Establishing small game posts at road and track entrances to the area. Reinforcing and where necessary re-locating game scouts at outposts. Increasing the frequency and effectiveness of foot patrols. Establishing an information network. Grading some airstrips. Installing the radios. Ground investigations of the rhino and other wildlife situations. Communicating with the local people to know their attitudes, to demonstrate the advantage of wildlife and to discuss plans. Circulating to all levels a simple information broadsheet or poster stating briefly the hunting and trading laws relating to the main species. Taking steps to reinforce the authority of the wildlife personnel.

CONCLUSION

This survey together with evidence from elsewhere has shown overwhelmingly how endangered the Northern White Rhino is and how rapidly the situation has deteriorated. It has also shown that development of Shambe as a National Park in the classic sense will be difficult and the approach must therefore be a flexible one, both to establish conservation status for the area and fauna and flora, but primarily and rapidly to ensure that the unique northern sub-species of White Rhino does not become extinct.

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PILOTS REPORT

AERIAL SURVEY AND SAMPLE CENSUS SHAMBE AREA:

APRIL, 1981.

PILOT: P.M.SNYDER
FRONT OBSERVER: DR. A.K. HILLMAN
REAR LEFT OBSERVER: T. TEAR
REAR RIGHT OVSERVER: DR. M. SOMMERLATE
AIRCRAFT: CESSNA 185 5Y-AOT
TOTAL SURVEY HOURS FLOWN: 18 HOURS
DATES: Ititial Aerial Recce: 22 April 1981
Sample Census Transect Flying: 23-24 April 1981
Final Survey Flight: 26 April 1981

CLIMATIC CONDITIONS:

DURING SURVEY:

Hot dry; end of dry season; afternoon storms.
No significant rainfall.
Land parched; Toichland unflooded; Narrow riverine strip of short green grass.

HERBIVORE DISTRIBUTION:

Cattle and wild herdgrazing ungulates concentrated on riverine greenbelts.
Elephant and buffalo and giraffe, smallish herds, more dispersed in the interior. Significant elephant use of papyrus swamps.

HUMAN DISTRIBUTION:

The town of Yirol is the District Centre. Major villagization surrounds it for several kilometres. Agricultural settlement flanks most roads to depth of one or more kilometres. Nomadic cattle camps advance to the riverine toichlands in the dry season and retreat to woodland villages during the rains. Numerous permanent and temporary fishing villages are located on the banks of the many channels of the River Nile. Shambe village is a major river port connected by causeway and road to Yirol and Rumbeck, the Provincial centre. Several villages and roadcamps are located on this road which bisects the proposed park. Numerous seasonal cattle camps are distributed throughout the Park area. The numbers of cattle in the area closely approximate the numbers of wild animals.

HUMAN USAGE OF WILDLIFE:

Parts of the area are professional hunting blocks. Nile Safaris, the concession holder, maintains a permanent camp at Pagarall. Clients are flown in and out of the camp at the rate of perhaps two or three per week during the six months hunting seasons.

The Primary trophies in the area appear to be Nile Lechwe, white eared kob and buffalo.

The Dinka and Nuer tribes inhabiting the area are cattle people who traditionally have not hunted for meat but for items of personal adornment.

Evidence from skeletons indicates that a considerable amount of hunting is taking place in the area.

The rhino appear to be virtually eliminated from the area.

No living rhinos were seen during the survey although more than ten rhino skeletons were identified.

Most animal carcasses and skeletons were located close to the roads.

SUMMARY OBSERVATIONS:

In the dry seasons, cattle, goats and wildlife utilize the same area, the short and medium grasses. Cattle and wildlife appear to be of equal numbers in the survey area.

At the moment, there does not appear to be destructive competition between the human and the herd ungulate populations.

The exception is the white rhino population which appears to have been seriously depleted in the past year.

No live rhino were seen during the survey despite several intensive searches for them in the prime rhino areas.

The area is inhabited by a considerable human population which by and large utilize the entire area by way of agriculture, grazing, fishing, hunting, and commerce.

In my opinion, the area would best be considered as a Game Management area to be managed with a keen eye to the wildlife resource potential considered in context with its other potentials.