

KRUGER NATIONAL PARK

DEPARTMENT OF RESEARCH MEMORANDUM

MONITORING OF UNGULATE POPULATION STRUCTURE IN THE KRUGER NATIONAL PARK

Report on a survey during August, September
and October 1989

Compiled by
Dr D R Mason
(Senior Research Officer)

Skukuza, May 1990

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MEMORANDUM

MONITORING OF UNGULATE POPULATION STRUCTURE IN THE KRUGER NATIONAL PARK REPORT ON A SURVEY DURING AUGUST, SEPTEMBER AND OCTOBER 1989

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INTRODUCTION

Data on age distributions (the proportions of different age-groups) and sex ratios pertaining within animal populations provide a useful basis for assessing recruitment and survival rates. While population trends reflect the interplay of numerous, often variable, environmental factors, they are effectively determined by the relative rates of natality and immigration versus mortality and emigration. Long term monitoring of ungulate populations is essential for understanding their dynamics vis-à-vis environmental variables and thereby providing a basis for enlightened management.

Monitoring of the major ungulate populations in the Kruger National Park (KNP) has largely depended on standardised aerial censusing techniques. These aerial surveys are conducted annually during the dry season and also provide some data on calf percentages and social structure for certain large herbivore populations, but not the more comprehensive data on sex and age composition that can be obtained from periodic sample counts on the ground. Moreover, apparent trends in population numbers based on aerial counts may be subject to counting variability between successive years. Field classifications of sex and age classes also have limitations, particularly in that they do not provide information on adult mortality, which is necessary for interpreting age ratios. Adult mortality rates may markedly influence estimates of juvenile mortality based on the proportions of juveniles and adults at different times, and increases or decreases in population size may occur without change in age ratios (see Caughley 1974). Ideally therefore, a combination of aerial and ground surveys should facilitate more reliable assessment of population trends by providing complementary data on population size and structure.

OBJECTIVES

To facilitate understanding of the processes which naturally regulate ungulate populations in the KNP, regular field classifications of sex and age classes are undertaken to establish base-line data on long-term population dynamics which may then be interpreted in relation to rainfall cycles, predation pressure, management practices, etc.

METHODS

Standardised ground surveys of population structure of ungulates (excluding buffalo, hippopotamus and impala) were conducted for the seventh successive year in 18 representative sampling regions (Fig. 1) delineated and simplified from the 35 landscape units described and mapped by Gertenbach (1983). Over 11 200km were traversed by vehicle between 14 August and 31 October 1989, making every effort to count and classify all ungulates encountered to ensure representative samples of their population structure. Criteria and methodology have been described by Mason (1990). Population samples of zebra, wildebeest and giraffe were analysed according to only four sampling regions (coinciding with administrative regions) demarcated by the Sabie, Olifants and Shingwedzi Rivers. Because impala frequently occur in large herds comprising several sex and age classes, sampling of their population structure was entrusted to a team of two observers in a vehicle, but was confined to regions A, B, C and D south of the Sabie River during 1,2 and 3 October, regions D,E and H between the Sabie and Olifants Rivers during 3,4,5 and 6 October, regions I,K,M and N between the Olifants and Shingwedzi Rivers during 5,6 and 9 October, and regions O,P and R north of the Shingwedzi River during 7,8 and 9 October.

Current estimates of ungulate population levels are derived from the 1989 ecological aerial survey using a fixed-wing aircraft to cover the entire KNP (Viljoen 1989).

RESULTS AND DISCUSSION

During the 1988/89 wet season in the KNP, drizzling, cold and windy weather from 11-13 October brought the first widespread spring rains (> 15mm) and triggered limited mortality of herbivores in certain areas. Follow-up rains over large portions of the KNP north of the Sabie River were patchy or variably sustained and virtually failed in January, which in 1989 was one of the driest on record. Although good rains during February temporarily relieved the drought over most of the KNP, near normal rainfall (and hence vegetative growth) during the 1988/89 wet season was largely confined to the Southern Region, while elsewhere the phase of predominantly below average rainfall since the start of the 1980's was continued. During the 1989 fieldwork, the region between the Olifants and Letaba Rivers and south of their confluence was particularly dry with very sparse ground cover.

Unusual weather conditions causing severe hailstorms were recorded in several localities during both the 1988/89 and 1989/90 wet seasons. During 1988 the first belt of hail fell in the Southern Region on 3 November around the Bob outpost along the Crocodile River in the southeastern corner of KNP; on 5 December hail of pigeon-egg size fell along the Matjulu firebreak and around the Stolsnek ranger station, with still heavier hail in a swathe along the Ngwenyeni firebreak from about 1 km south of the drift over the Mbyamiti Stream to the Skukuza-Pretoriuskop tar road in the north, and extending westwards as far as the Transport Dam. Further reports of heavy hail on 5 December 1988 involved a belt about 3,5 km wide around the high water bridge over the Sabie River, which knocked pieces of bark off trees, and belts of unknown extent in the Central Region, one crossing the Skukuza-Tshokwane tar road about 17 km southwest of Tshokwane and another with some hailstones of 40-50 mm over the Metsi-metsi wilderness trails area east of Tshokwane. These hailstorms can be expected to have caused some mortality among game, although no carcasses were reported. During 1989 a hailstorm about 1 km wide was recorded in the Mpondo Dam area of Crocodile Bridge district on 13 November, while on 22 October in the Northern Region heavy hail fell over part of the Letaba district south from the restcamp and the Engelhard Dam, causing known deaths of 27 impala plus smaller animals and birds. Some hail accompanying heavy rain (84,5 mm) was also recorded on 22 October in the Phalaborwa area.

Analyses of sex and age composition and categories of social units are tabulated separately (Tables 1 - 22). Where data for certain ungulates may not be representative due to small sample size, the proportions of sex and age classes and social units are merely listed for all sampling regions combined. Major sampling compartments demarcated by rivers have been designated according to the administrative regions with which they coincide, viz.

- Southern Region - between the Crocodile and Sabie Rivers;
- Central Region - between the Sabie and Olifants Rivers;
- Northern Region - between the Olifants and Shingwedzi Rivers;
- Far Northern Region - between the Shingwedzi and Limpopo Rivers;

ZEBRA (Tables 1 and 2)

Aerial counts of zebra in the KNP in relation to annual percentages of adult females with juveniles in population samples over the past seven years are summarised below:

Year	Population sample	%J	J/100AF	Aerial count	Aerial count trend (%)
1983	1 119	12,4	28,37	26 184	- 7,5
1984	1 341	16,7	39,44	30 457	+ 16,3
1985	1 318	13,9	32,39	29 964	- 1,6
1986	1 765	16,3	37,55	33 168	+ 10,7
1987	2 232	13,9	31,45	32 819	- 1,1
1988	2 085	15,4	33,72	30 733	- 6,4
1989	2 286	15,7	35,05	32 458	+ 5,3

The following social units were recorded:

- 1 lone AF - region A
- 1 lone AM - region M
- 1 breeding group (3 AF + 1 YF + 3 J) - region M
- 1 breeding group (3 AF + 2 YF) - region M
- 1 breeding group of at least 4 including at least 2 J - region M
- 1 bachelor group comprising 2 AM - region N
- 2 lone AM - region P
- 1 breeding group (2 AF) - region P
- 1 breeding group (5 AF + 1 YF + 3 J) - region P

WHITE RHINOCEROS

Total sample = 33

Sex and age composition : 27 adults (18 M, 9 F), 1 yearling (F), 5 juveniles (4 M, 1 unsexed).

Social units : 9 lone AM, 3 bachelor groups (of 2 AM each), 1 (AM + AF) pair, 1 (AF + YF) pair, 4 (AF + J) pairs, 1 (AF + J) pair accompanied by 1 AM, 1 association of 2 AF accompanied by 1 AM).

Regions where sightings were recorded : A,B,C,D,E,F (39,4% of rhinos classified were from region A).

The 1989 aerial count total of 1 284 white rhinos in the KNP was 4,2% higher than in 1988. Mean group size recorded from the ground was 1,7 (range 1-3) compared with a mean group size of 2,3 from the air, and 45,0% of ground observations involved single individuals, all adult males. Singletons comprised 27,3% of the total number of rhinos encountered (n = 33) during the ground survey, compared with 10,8% of the population recorded from the air.

BLACK RHINOCEROS

One adult female, estimated as 3 - 3½ years old, was seen along the northern fringe of the Crocodile River about 1 km ESE of Bume outpost (region C) on 15 August 1989. Black rhinos recorded in the KNP during the 1989 aerial survey totalled 40, although the estimated minimum population size is over 150.

OTHER SPECIES

ORIBI(*Ourebia ourebi*)

An adult male and an adult female were reported together along the Faiy loop road in the Pretoriuskop district (region A) on 89.10.19 (E Wood). Sporadic sightings of oribi in the Pretoriuskop district have been reported since 39 were released in 1973, followed by a further 24 in the adjoining Stolsnek district in 1974. Notwithstanding such isolated instances of survival, the success of the reintroduction exercise appears dubious and moreover the Pretoriuskop district was evidently at the limit of the historical distribution range of oribi in the eastern Transvaal. Since 1962 successive batches of oribi totalling 143 individuals have been translocated to the KNP where most were held in two large enclosures in the Pretoriuskop region until 1974, but mortality was high.

BUSHPIG (*Potamochoerus porcus*)

Bushpigs have a very restricted distribution in KNP, mainly in the area between the Limpopo and Levubu Rivers. Outside this region where they are regularly seen, they are occasionally reported in the southwestern portion of the KNP (Malelane, Stolsnek and Pretoriuskop districts). In the Malelane district (region A) a group of three bushpigs was reported along the north bank of the Crocodile River about 200 m downstream from the mouth of the Mhlebeni watercourse, on 89.08.01 (P Wolff).

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