



# 12

*White rhinoceros populations in the  
Kruger National Park during the 1900's*  
S. G. J. Joubert

## CHAPTER 12

# White rhinoceros populations in the Kruger National Park during the 1900's – S.C.J. Joubert

### Introduction

Sufficient evidence exists to suggest that the white rhinoceros (*Ceratotherium simum*) enjoyed a very wide distribution throughout most of the African continent during the Pleistocene (Smithers, 1983). With the passage of time these once widespread populations receded and were eventually confined to two widely separated populations in East and southern Africa.

The more recent population histories of the white and black (*Diceros bicornis*) rhinoceros were documented in an exhaustive literature study by Du Plessis (1969). The white rhinoceros ranged widely across the northern regions of southern Africa but were severely decimated, especially during the 19th century, and by the mid-1800's they were largely limited to an enclave in KwaZulu-Natal (KZN).

Black rhinoceros were even more widely distributed than the white rhinoceros. They, too, suffered severely with the advent of man and by the beginning of the 20th century, their distribution in southern Africa, though widespread, was little more than a patchwork of isolated populations compared to their previous distribution (Du Plessis, 1969).

The fate of especially the white rhinoceros population in the southern areas of the Kruger National Park (KNP) and the adjoining Lowveld areas of Mozambique has been well documented by Pienaar (1970). The various authorities quoted generally agree that the final extirpation of this species in these areas was in 1896, in the thickets of the N'watimhiri watercourse, a tributary of the Sabie River in the present-day Kruger National Park.

The reintroduction, colonisation history and population trends of this species has also been documented by Pienaar (1970), Pienaar, Bothma & Theron (1992, 1993), Joubert (1979–1986), Viljoen (1987–1995), Joubert (2006) and Whyte & Kruger (2005).

### Reintroduction

When the National Parks Act was promulgated on 31 May 1926, the old Sabie and Shingwedzi game reserves were merged and proclaimed the Kruger National Park. At the first meeting of the fledgling National Parks Board, on 16 September 1926, the possibility of reintroducing the white rhinoceros to the KNP was discussed. This ideal was further stimulated by a visiting scientist from America, Herbert Lang, who strongly advised that white rhinoceros be reintroduced from the stocks in the Hluhluwe-Umfolozzi complex in KZN to different parts of their erstwhile range (Pienaar 1970).



*First rhinoceros cow caught in Umfolozi to be introduced to the Kruger National Park*

Due to the initial lack of suitable capturing techniques and only after the advent of chemical restraint methods was it possible to initiate the reintroduction programme to the KNP – on 14 October 1961, 65 years after the National Parks Board first raised the issue. On this historical date four white rhinoceroses, two bulls and two cows, were released into a specially prepared enclosure, the Fayi enclosure, close to the Pretoriuskop ranger's quarters.

Over the next 18 months four more rhinoceroses were released into the Fayi enclosure: two cows in June/July 1962 and two bulls in September 1962 and May 1963, respectively. The two cows were readily accepted by the animals originally released into the enclosure but the two bulls were fiercely challenged, resulting in the one succumbing to injuries and the other being released to save its life.

In later years the small founder population in the Fayi enclosure was to yield important information on white rhinoceros reproductive potential, as reported elsewhere in this chapter.

In a major reintroduction programme between 1963 and 1974, in co-operation with the Natal Parks Board, white rhinoceroses from the Umfolozi Nature Reserve were translocated to the KNP in three phases. The translocations were by road at weekly/fortnightly intervals and entailed the following:

- May 1963 to September 1964

During this period the first releases into the KNP were made at the following localities: Sekurakwane/Doispane, along the Sabie River on the Pretoriuskop Ranger Section (54), Nhlanguzane/Mpanamana between Crocodile Bridge and Lower Sabie (13), on the

Crocodile Bridge Ranger Section and 16, mostly at Shipandani along the Tsendi River and some a bit further west, on the Mahlangene Ranger Section.

Remarkably low mortalities were experienced during the translocation process and only three of the animals died en route to the KNP due to various causes. The animals released during this phase included at least 38 bulls and 41 cows.

- December 1968 to September 1969  
A further 43 rhinoceroses were received from the Natal Parks Board, of which two died. A total of 41 animals, comprising 28 bulls and 13 cows, were released at the Mlambane dam in the Malelane region of the KNP.
- 1972 and 1973  
A further 204 rhinoceroses were received from the Natal Parks Board. Of these three died before being released while 167 were released at Shabin and Mestel dam and 34 at Newu. These three localities are in the south-western extreme of the KNP, on the Pretoriuskop and Stolznek ranger sections. The sex ratio of the animals released, was 99 bulls and 102 cows.

Table 12.1 shows that during the period 1963 to 1973, a total of 329 rhinoceroses from the Umfolozi Game Reserve were released into the KNP, in addition to the seven in the Fayi enclosure. During this period a cow from the Mlilwane Nature Reserve, in Swaziland, and a bull, possibly from one of the adjoining private nature reserves in the Orpen region, were also added to the population. The mortality rate of 2.6% achieved during the relocation process may be regarded as extremely low for a translocation operation of this magnitude.

**Table 12.1: The reintroduction of white rhinoceroses into the Kruger National Park, 1963–1973**

PERIOD	BULLS	COWS	MORTALITIES	TOTAL
1963–1964	38	41	3	82
1968–1969	28	13	2	43
1972–1973	99	102	3	204
TOTAL	165	156	8	329
%	50	47.4	2.6	100

### Colonisation history and habitat preference

One of the features of the reintroduction process was that the bulk of the animals settled in close proximity to the release site. A few, mostly bulls and probably due to social pressures, wandered in scattered directions from the release sites before settling.

From the release areas expansion and colonisation into new areas took a very definite course into the drier watershed regions of the Sabie and Crocodile rivers. These included the headwaters of the N'waswitsaka, Mtshawu, Mbyamiti, Mlambane, Bumi and Vurhami watercourses. These areas of gently undulating *Combretum* woodland habitats coincided closely with those they inhabited in the Umfolozi Game Reserve (Pienaar, 1970).

Though strong populations persisted in the higher altitude, higher rainfall areas with a strong field layer dominated by tall grasses (*Hypertelia/Hyparrhenia* spp) in the Pretoriuskop region, their preference for the drier habitats with shorter grasses was clearly evident.

This trend was also illustrated by the founder population released in the Nhlanguzwane/Mpanamana areas. These areas are situated on basalt plains with deep fertile soils which support a strong field layer of medium tall grasses (*Themeda triandra*, *Panicum coloratum*, *P maximum*, *Urochloa mosambicensis*). While the releases resulted in sound populations within these areas the major concentrations gradually built up in the adjoining *Acacia welwitschii* plant community, with a sparse field layer and short grasses, to the west of the plains.

No white rhinoceroses were released in the Central District of the KNP, i.e. the area between the Sabie and Olifants Rivers. By 1964, however, the first reports of a rhinoceros crossing the Sabie River were received. These were subsequently followed by several more. It could not be established where the rhinoceros were crossing the river (Pienaar 1970) but within a few years small break-away populations were established along the Vutome watercourse, to the north-west of Tshokwane, and in the region of N'wanetsi. From the Vutome the rhinoceroses spread further west along the N'waswitsontso River and north into the *Acacia welwitschii* plant community and adjoining sandveld areas to the east of it. They also went south into the upper reaches of the Mlondozi watercourse, Saliji, and north-westwards to Ripape.

From N'wanetsi the satellite population expanded northwards into the Gudzane/Mtomene catchments and further north along the western foothills of the Lebombo Mountain Range to Bangu.

Currently, white rhinoceroses are widespread throughout most of the Central District. To what extent their numbers were augmented over time by further incursions from the Southern District, which is likely, or to what extent the first incursions contributed to this colonisation, will never be known with any certainty.

Almost immediately after the release of the 16 rhinoceroses on the Mahlangene Section, in the northern regions of the KNP, they split into different directions and only a bull and cow remained at the site of release. This bull and cow later settled further up the Tsendi River at Mabohlelene, remained there for several years and reared a number of calves (Pienaar, 1970). In the mid-1970s this group moved up to Tsange, along the Shingwedzi River. From there their numbers increased, their range expanded and though not in the numbers or densities of the populations in the Southern and Central districts, the population is well established (Refer Table 12.2).

In all cases of the colonisation history it became apparent that the density of the woody vegetation played a much lesser role in habitat selection than access to relatively sparse, short grass habitats. In this respect open areas on sodic soils along watercourses also played an important role.

By the late 1980's, the KNP had well established and flourishing populations of white rhinoceroses and any destabilising effects from the reintroduction exercises had been settled.

This offered an ideal opportunity of evaluating the factors that played an important role in this hugely successful reintroduction and recolonisation project. To gain an insight into these factors Pienaar, Bothma & Theron (1992, 1993) determined a preference index for rhinoceros, based on habitat availability and density, for the 35 landscape types of the Kruger National Park (Gertenbach, 1983) and census results derived from Ecological Aerial Surveys (Joubert, 1983; Viljoen, 1991). The results of these analyses illustrated which landscape types were selected, those that were avoided and others that were considered neutral. Essentially, the major factors that contributed towards the acceptability of habitats revolved around a field layer with short grass (not taller than 1m), an open understory in the woody vegetation component and the presence of pans for mud wallows.

### Population trends

In **Table 12.2** the census results for the white rhinoceros population are given. The figures up to 1973 are obviously not a reflection of population increases only, but also include those reintroduced until then.

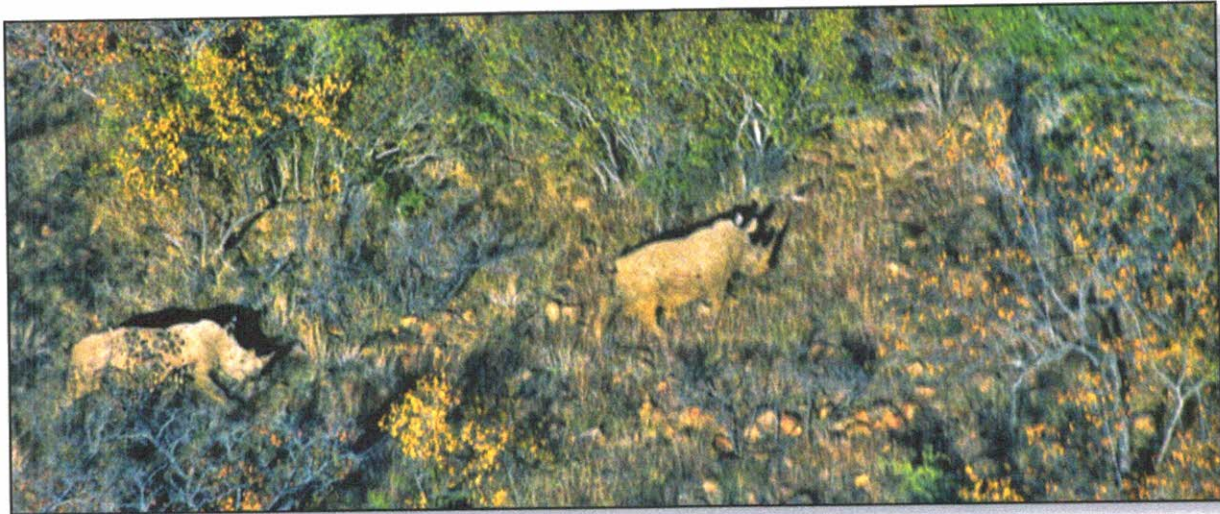
The census figures were derived by two methods, i.e. for the period until 1978, the rhinoceroses were counted by helicopter as part of a general elephant and buffalo census. The census was conducted during August/September at the end of the winter season when surface water was restricted to perennial resources and the deciduous trees had shed their leaves. Visibility was good, therefore, and water-dependent species, such as rhinoceros, were concentrated close to water. A four-seater Jet Ranger helicopter, flying at 800 feet to 1000 feet above ground level and following the major drainage systems, was used for the census.

From 1979, the census totals were derived from the Ecological Aerial Surveys, a census conducted in a Cessna 206, high-wing aircraft, flying at 150–180 feet above ground and 90 miles per hour airspeed. Parallel strips, 800 m apart, ensured total coverage of the Kruger National Park. The census was also undertaken during the winter months. The Cessna was replaced by a twin-engine Partenavia Observer in 1987.

At the time of the censuses the rhinoceroses were generally easily visible and countable. In 1998, the census method was changed to Aerial Line Surveys. This implied sample counts with transects placed approximately 5.6 km apart to cover 15% of the KNP. The surveys were done with the same aircraft as that used for the EAS (Partenavia) and operated at the same height and air speed.

**Table 12.2: Census totals for the white rhinoceroses in the Kruger National Park, as obtained from helicopter censuses for the period 1971 to 1978, from Ecological Aerial Surveys for the period 1980 to 1994 and from Aerial Line Surveys for the period 1998 to 2006.**

YEAR	REGION			TOTAL: KNP
	Southern	Central	North	
1971	72	-	10	82
1972	105	8	5	117
1973	156	19	11	186
1974	-	-	-	-
1975	337	31	14	382
1976	335	26	6	367
1977	383	23	25	431
1978	385	26	24	435
1979	-	-	-	-
1980	527	47	24	598
1981	505	57	40	602
1982	596	76	33	705
1983	606	67	53	726
1984	709	104	60	873
1985	738	133	48	919
1986	827	186	48	1 061
1987	781	155	81	1 017
1988	1 005	171	53	1 229
1989	1 008	197	79	1 284
1990	1 133	176	72	1 381
1991	1 313	197	54	1 564
1992	1 417	296	90	1 803
1993	1 415	397	59	1 871
1994	-	-	77	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
<b>Arial Line Survey</b>				
1998	-	-	-	2 846
1999	-	-	-	3 067
2000	-	-	-	2 655
2001	-	-	-	5 241
2002	-	-	-	4 428
2003	-	-	-	4 509
2004	-	-	-	4 533
2005	-	-	-	6 942
2006	-	-	-	8 876



During several of the census surveys calves under the age of a year were recorded. The results of the calf percentages are given in Table 12.3.

**Table 12.3: White rhinoceros calf percentages for the Southern District of the Kruger National Park for the period 1976 to 1986, as obtained from census surveys.**

YEAR	CALF PERCENTAGES		
	Total	Calves	Percentage
1976	335	37	11.04
1977	383	41	10.70
1978	252	19	7.54
1979	417	23	5.52
1980	527	73	13.85
1981	505	63	13.48
1982	596	62	10.40
1983	606	49	8.09
1984	709	55	7.76
1985	738	113	15.31
1986	929	96	10.33
<b>MEAN FOR THE PERIOD 1976-1986</b>			<b>10.36</b>

Inter-calving periods recorded in the Fayi enclosure ranged from 24 to 49 months, with a mean of 34 months for 10 records. The gestation period of the white rhinoceroses is 16 months and if 34 months may be accepted as the mean inter-calving period for free-roaming white rhinoceroses in the KNP, it would imply that cows conceive approximately 18 months after giving birth.

Natural mortalities are not high amongst white rhinoceroses. However, mortalities due to intra-specific competition, such as deaths due to injuries sustained in fights between bulls, and deaths among especially immature animals due to predation, have been recorded. Old age and other forms of injuries most likely also account for a number of deaths each year.



Given a mean calving percentage of 10.36% over a period of 10 years and a limited number of deaths, an annual recruitment rate in the region of 8% does not seem unreasonable. Should this be accepted, a turnover of the rhinoceros population can be expected every nine years.



### Conclusions

October 2011 marked a half a century since the first white rhinoceroses were reintroduced into the KNP. In this time they successfully colonised virtually all the suitable habitats of the Park. Furthermore, though showing very definite ecological preferences, they have established a presence in a wide range of habitats which may generally be considered sub-optimal for the species.

Given the colonisation history and population trends the reintroduction of the white rhinoceros into the KNP may be regarded as highly successful.

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