

Notes on wild dog *Lycaon pictus* and lion *Panthera leo* population trends during a drought in the Kruger National Park

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Wild dog *Lycaon pictus* and lion *Panthera leo* populations in the Kruger National Park appeared to undergo an increase during a drought period in the early 1990s. Newly established packs, high adult survival and pup productivity contributed to an increase in the wild dog population and evidence for high predation success during the height of the drought is presented. An increase in the lion density between 1989 and 1993 on the northern basalt plains, as well as changes in the structure of the population, seem to be related to changes in prey populations, particularly to a decline in numbers and condition of buffalo *Syncerus cafer*.

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Introduction

During 1991/1992 the Kruger National Park (KNP) experienced the severest drought in its recorded history (Zambatis & Biggs 1995).

Whereas herbivorous animals usually decline in number during droughts (Walker *et al.* 1987), carnivores might be expected to respond differently. Their prey will be in poor condition and therefore easier to kill, so that, at least initially, there might be an increase in food availability, which in turn might lead to an increase in carnivore numbers. Furthermore, changes in vulnerability of different prey species might occur.

Carnivore population trends are difficult to monitor in the KNP as it is impossible to employ the aerial census techniques used to count herbivores (Joubert 1983). Nevertheless, ongoing research projects on wild dogs *Lycaon pictus* in the southern district and lions *Panthera leo* on the basalt plains north of Shingwedzi give an indication of the manner in which the populations of these

carnivores responded to the drought. Elsewhere (Mills *et al.* 1995), the response of lion predation patterns to rainfall is discussed.

Wild dog

The wild dog sub-population in the area south of the Sabie River has been closely studied and monitored since the beginning of 1990. Each pack in the study area has been radio collared and the composition documented monthly. From 1990 until January 1993 there was a steady increase in wild dog numbers, reaching a peak in January 1993 (Table 1) after a series of dry years including the 1991/92 drought referred to above (Table 2).

The initial increase in the wild dog sub-population was due to the formation of three new packs (Gomondwane, Mbyamiti and Newu) during 1990 (Table 1), a comparatively dry year compared with 1989 which had been a high rainfall year. During the next

Table 1
The minimum number (adults - pups) of wild dogs in packs in the southern district of the KNP, 1990 - 1993

Pack	Jan 1990	July 1990	Jan 1991	July 1991	Jan 1992	July 1992	Jan 1993	July 1993	Jan 1994
Skukuza	18(11-7)	29(11-18)	13(8-5)	27(10-17)	8(3-5)	6(6-0)	7(7-0)	3(3-0)	4(4-0)
Pretoriuskop	13(7-6)	14(6-8)*	11(5-6)	24(7-17)	17(7-10)	26(14-12)	16(8-8)	-	-
Doispane	13(9-4)	21(8-13)*	14(7-7)	25(9-16)	8(6-2)	27(9-18)	23(8-15)	38(21-17)	30(14-16)
Afsaal	16(9-7)	12(12-0)	9(9-0)	15(9-6)*	13(9-4)	25(12-13)*	22(9-13)	45(22-23)	42(19-23)
Crocodile Bridge	7(5-2)*	7(7-0)	6(6-0)	6(6-0)	5(5-0)*	13(5-8)*	13(5-8)*	?	?
Gomondwane	-	13(4-9)	8(3-5)	14(7-7)*	10(9-1)	4(4-0)	6(6-0)	15(5-10)*	12(4-8)
Mbyamiti	-	21(5-16)	8(4-4)	13(6-7)	10(6-4)	19(6-13)	15(5-10)	19(12-7)*	14(10-4)
Nwaswitshaka	-	5(5-0)	5(3-2)	-	-	-	-	-	-
Newu	-	-	5(5-0)	13(5-8)*	10(5-5)	19(9-10)*	11(9-2)	11(5-6)*	6(4-2)
Thekwane	-	-	-	-	-	8(2-6)*	7(2-5)	6(6-0)	4(4-0)
Matjulu	-	-	-	-	-	-	3(3-0)	-	-
Nomad	-	-	-	-	-	3	1	2	-
Total Southern District	67(40-27)	122(58-64)	79(50-29)	124(50-78)	81(50-31)	150(70-80)	124(63-61)	139(76-63)	112(59-53)

* Minimum number, i.e. exact composition of the pack was not determined.

two years 1991 and 1992 adult survival rates were particularly high (Table 2). Moreover, more pups were produced in 1991 and 1992 than in the other years (Table 1).

Evidence that wild dogs obtained more food during the height of the drought is given in Table 3 which shows a significant difference between the frequencies with which dogs were located on kills between November 1991 and October 1992, when the mean rainfall from the four rain stations in the area

was only 295 mm, in comparison with other times ($\chi^2 = 9.02$; $df = 1$; $p < 0.01$).

Apart from increased food availability to wild dogs during dry periods the lack of cover might also be advantageous to them. Unlike stalking predators which rely heavily on cover for hunting success, dogs are cursorial hunters (Estes & Goddard 1967), which probably benefit from fewer obstructions concealed in rank grass during dry times. Additionally it has been found that

Table 2
Mean annual rainfall from four weather stations in the southern district of the KNP and the percentage of wild dogs over one year old that survived each year between 1990 and 1993

	1989	1990	1991	1992	1993
Number of known dogs in the study area at the beginning of the year		33	48	52	60
Percentage which survived until the end of the year		64	71	81	63
Rainfall*	731	512	393	525	523

* The long term mean for the four stations = 612.5 mm.

Table 3
Frequency with which wild dogs were located from the air on kills during the height of the drought in comparison with at other times

	During the drought (Nov 1991 - Oct 1992) ¹	During other times
Number of tracking flights undertaken	57	215
Number of times dogs found feeding on a kill	10	11

¹ when an average of only 295 mm rain was measured at four weather stations in the study area, and at during the study

lions are important predators of wild dogs (Mills & Gorman *in prep*), so the more open habitat created during the drought may have lessened the chances of lions stalking up on wild dogs.

Lion

The lion population in the KNP also seems to have responded to the drought. The best evidence for this was gleaned on the basalt shrub mopani *Colophospermum mopane* plains north of Shingwedzi, where a survey of the lion population carried out in October 1993 using the technique developed by Smuts *et al.* (1977), showed a large increase in the number of lions in this area compared

to a previous survey in 1989. A density of one lion per 8.9 km², and one adult or subadult per 10.4 km² was found in 1993, compared with a density of one adult and subadult per 30 km² found in the 1989 survey.

Not only were there more lions on the plains in 1993, the structure of the population was different to what had been previously found (Table 4). More adult males ($\chi^2 = 4.38$; $df = 1$; $p < 0.05$) and fewer cubs ($\chi^2 = 8.30$; $df = 1$; $p < 0.01$) were encountered during the 1993 survey.

Prey populations on the northern plains have also undergone some dramatic changes since 1989. All four of the lion's major prey

Table 4
Sex ratios and age composition of lions from two surveys on the northern plains in the KNP

Survey	Sex ratio (male:female)			Age composition (%)					
	Adult	Subadult	Adult & subadult	Adult	Subadult	Large cub (7-±15 m)	Small cub (0-6 m)	Adult & subadult	Cub
1989*	1:2.25	-	1:1.3	-	-	23.1	15.4	61.5	38.5
1993	1:1.1	1:1.2	1:1.1	71.9	13.5	14.6	0	85.4	14.6

* Adult and subadult females were not separated during this survey.

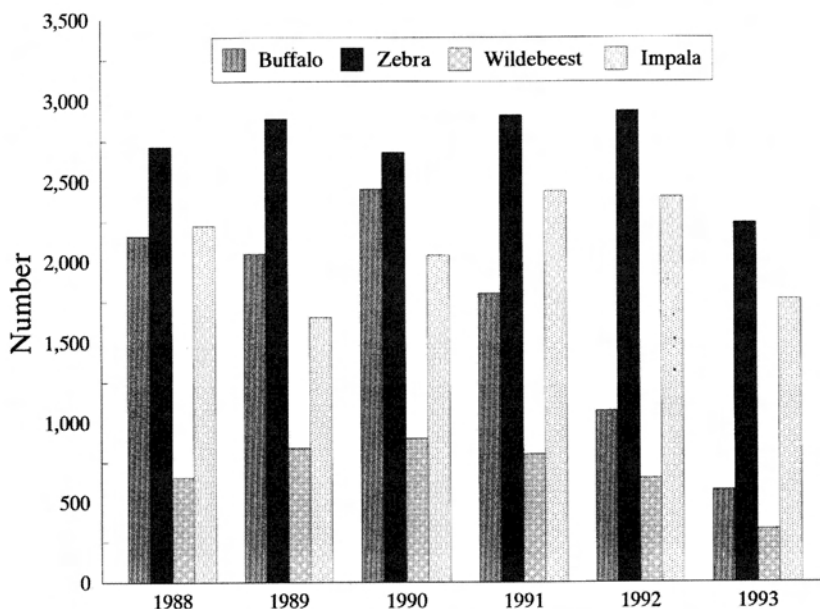


Fig 1. Numbers of buffalo, zebra, wildebeest and impala counted on the plains north of Shingwedzi during the annual ecological aerial surveys, 1988 - 1993.

species in the KNP; impala *Aepyceros melampus*, zebra *Equus burchellii*, wildebeest *Connochaetes taurinus* and buffalo *Syncerus cafer* (Pienaar 1969; Mills *et al.* 1995 *in press*) have declined since 1990, the buffalo particularly so (Fig. 1). The drought, and in the case of buffalo also the anthrax epidemic of 1991, are the major causes for these declines. Due to the deteriorating condition of the buffalo in particular they became more vulnerable to predation (Mills *et al.* 1995 *in press*) and so the lions were presented with a greatly increased food supply. Male lions, in particular, seem to have capitalised on this situation, probably through increased survival and a tendency to stay in their natal territories because of the abundant food supply.

Conclusions.

The limited data presented here support the hypothesis that drought conditions benefit carnivores in the short term. A similar phenomenon was recorded in Mana Pools National Park, Zimbabwe with lions (Dunham 1992).

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