GRIMBEEK A M

THE ECOLOGY OF THE LEOPARD (PANTHERA PARDUS) IN THE WATERBERG

MSc (Zoology)

UP

1992

THE ECOLOGY OF THE LEOPARD (PANTHERA PARDUS) IN THE WATERBERG.

by

ANTON MICHAEL GRIMBEEK

Submitted in partial fulfilment of the requirements for the degree of

M.Sc. (Zoology)

in the

Faculty of Science

University of Pretoria

Pretoria

January 1992

Majawin

THE ECOLOGY OF THE LEOPARD (<u>PANTHERA PARDUS</u>)

IN THE WATERBERG.

by

A.M. GRIMBEEK

Supervisor: Prof. J.D. Skinner

Mammal Research Institute

Department of Zoology

University of Pretoria

Pretoria

ABSTRACT

Although the opportunistic feeding habits of leopards were evident in this study, scat analysis showed that ungulates were by far the predominant food, with impala being the most frequent item. The fact that cattle calves were only taken up to ± 100 days old, emphasize the relevance of a proper stock management program to prevent stock losses. In addition, where such measures were impractical, tempory fisical barriers such as electric fencing showed potential for application.

Modification on different capture techniques were

investigated not only to capture leopards for radio collaring but also for the elimination of problem leopards.

The effective home range size of a resident male and female leopard in the Naboomspruit area were calculated at 303 km² and 157 km² respectively. A density of one leopard per 53 km² are suggested for the Naboomspruit study area. Both leopards were predominantly nocturnal with some crepuscular activity. Translocation experiments revealed different results. The conducting of translocations in farming areas, where problem leopards are involved are however not suggested.

Leopard density and distribution patterns showed that numbers are relative safe, and that populations are currently to a large extent linked, which makes natural gene flow a possibility.

Although suitable areas for leopards thus exist, these may not be available as homogenous units in the future, due to increasing human pressure.

ACKNOWLEDGEMENTS

I am grateful for the motivation and support of my supervisor, Prof. J.D. Skinner, as well as the advice and assistence received from Prof. R.J. van Aarde, Drs. N. Fairall, A.S. van Jaarsveld, H.M. Dott, and Messrs M.A. Haupt and V. O'Neill of the Mammal Research Institute; the kind help of Mss Nita Brosnan and Babsie Potgieter was much appreciated.

Financial support was provided through a bursary from the Foundation for Research Development and grants from the Wildlife Society of Southern Africa, the Transvaal Division of Nature and Environmental Conservation and Anglo American & De Beers Chairman's Fund. Contributions were also made by Total S.A., Consolidated Wire Industries, Galagher S.A., Mr J.H. Steenkamp and Mr A.F. Geyser, Silgro Feeds, Bonnox and Pat Hinde Toyota.

Apart from financial support, the Transvaal Division of Nature and Environmental Conservation also assisted in numerous other ways. Dr. P.F. Mulder kindly provided maps for plotting leopard distribution, while law inforcement officers throughout the Transvaal helped in establishing distribution patterns. The Problem Animal Unit through Mr. T. De Wet not only made available five captured leopards for translocations, but also provided traps and together with Mr. M. Keith, the benefit of their expertise. At the Doorndraai Dam Nature Reserve, Messrs. F. Coetzee, L. Malherbe and G. Odendaal were most helpful. In addition Mr. F. Postma commented on an early draft on the legislative aspects.

The enthusiasm, advice and cooperation of Bok and Cecile Schoeman, including the loaning of their home in the study area were invaluable. Bok's untiring efforts in helping to capture the study animals will always be remembered. The Schoeman family, Hennie van der Walt, Derick and Silvia van Staden, Leon and Bonita Boon, Chris and Marina Basson and the late Oom Ben van Niekerk and his wife Maggie are thanked for their unfailing hospitality and support. The logistical support and motivated interest of Mr Willie Joubert of Mabula Game Lodge and Mr Hennie van der Walt from Naboomspruit was much appreciated.

Many more people assisted with fieldwork. In particular I would like to mention Mssrs N. Burger, D. Pienaar, O. van Loggerenberg, D. Buys, J. Human and the late Mr. B. Swanevelder. Mr H. Braack and J. Grosel also checked parts of my first draft.

Mr W. Labuschagne, Director of the National Zoological Gardens made facilities available for the treatment of study animals. Drs. H. Ebedes, D.G.A. Meltzer, J. Scwann and A.A. McKenzie are acknowledged for their expertise in capturing and immobilizing study animals.

Prof. J.D. Skinner, Prof. J. du P. Bothma, Dr H.J. Keogh and Dr. I.L. Rautenbach (Transvaal Museum) made reference material available for scat analysis. Prof. J. Du P. Bothma's discussions and interest in the project were also a source of motivation. The assistence and interest of Mr. J. Potgieter (C.S.I.R) in the radio tracking procedures is much appreciated.

Messrs. A. Gauge, D. Carr, F. van der Merwe and F. van Staden kindly made their aeroplanes available for radiolocations from

the air.

Thanks are due to Erena Botha of the Wildlife Society for her efforts in assisting to get the project off the ground.

The efforts of Mr J. van Rensburg from the G.I.S. Lab,
University of Pretoria, regarding data computerization are
greatfully acknowledged. Appreciation is also expressed to my
parents for their constant support.

Finally, my sincere thanks go to my wife, Riekie, who assisted in all phases of the project. She also typed all drafts of the manuscript as well as providing much needed moral support and encouragement.

CONTENTS

		Page
1	: INTRODUCTION	
	(ID CENTINES .	
	Ferspective	1
	Primary Objectives	3
	Description of study areas	
	Location	5
	Topography and Geology	5
	Climate	9
	Vegetation	10
2	: THE LIVE CAPTURING OF FREE RANGING LEOPARDS	
	Introduction	12
	Objectives	13
	Methods	13
	Results	22
	Single Door Walk-in Box Trap	22
	Double Door Walk-in Box Trap	22
	The Jump Trap	23
	The Horizontal Double Coil Spring Steel Trap	23
	Discussion	om

vii

3 : SPACE UTILIZATION

	Introduction	33
	Objectives	34
	Methods	35
	Results	39
	Extent of movement	39
	Occupancy of home range	44
	Leopard density	47
	Activity patterns	47
	Discussion	51
:	DIET	
	Introduction	68
	Objectives	69
	Methods	69
	Results	72
	Prey abundance	72
	Scat analysis	75
	Prey capture and feeding behaviour	78
	Consumption	81
	Discussion	83

5 : TRANSLOCATIONS

	Introduction	
	Objectives	98
	Methods	98
	Results	100
	Discussion	109
6:	CONSERVATION IN FARMING AREAS	
	Introduction	124
	Objectives	125
	Methods	125
	Results	126
	Viable populations and high conflict areas.	126
	Estimated number of leopards in the Transvaal.	127
	The Scope of the problem.	127
	Feasible solutions.	131
	Discussion	131
7:	SUMMARY	141
	OPSOMMING	146
	REFERENCES	151

LIST OF FIGURES

FIGURE

		PAGE
1	Topographical map of the Melk River study area (Scale 1 : 250 000).	6
2	Topographical map of the Naboomspruit study area (Scale 1 : 250 000).	8
3	The TPA Double Door Walk-in Box Trap.	16
4	The Boon Double Door Walk-in Box Trap.	16
5	The No 4 Oneida Jump Trap.	18
6	The Horizontal Dubble Coil Spring Steel Trap.	21
7	Dart for mounting on the Coil Spring Steel Trap.	21
8	Normal left paw (top) and steel trapped right paw (bottom) of a female leopard.	24
9 -	A Cessna 185 with yagi antennas attached to the wing struts.	36
10	"Observation - area curves" (Odum & Kuenzler 1955) for the male and female leopard in the Naboomspruit study area.	40
11	Spatial distribution of the male and female leopard territories, with 12h00 resting sites and male cattle calf killing sites in the Naboomspruit study area.	42
12	Spatial distribution of the male leopard's summer and winter territories with 12h00 resting sites.	43
13	Three - dimensional, ARC / INFO TIN MODULE - generated map representation of (a) Naboomspruit study area (b) male leopard space use (c) female leopard space use; based on the number of plots in each grid (N = Naboomspruit; P = Potgietersrus).	45

14	Three - dimensional, ARC / INFO TIN MODULE - generated map representation of (a) male leopard summer space use (b) male leopard winter space use, based on the number of plots in each grid.	46
15	Diel activity patterns of the male and female leopard in the Naboomspruit study area.	48
16	Diel summer and winter activity patterns of the male leopard in the Naboomspruit study area.	50
17	Post release movements of translocated leopard A.	101
18	Post release movements of translocated leopard C.	105
19	Post release movements of translocated leopard D.	107
20	Post release movements of translocated leopard E.	108
21	Leopard distribution in the Transvaal.	128

LIST OF TABLES

TABLE		PAGE
1	Overall measurements (mm) and mass (kg) of leopards captured in the Waterberg (1985 - 1988).	4
2, 1, -, 1	Species and abundance of the mammalian fauna ()1 kg) in the Melk River (1985 - 1986) and Naboomspruit (1986 - 1987) study areas.	73
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Leopard diet in two areas of the Waterberg as determined by scat analysis (% of occurrence). Carcass observations are in parenthesis.	74
4	Percentage occurrence (n = 76) of different prey groups represented in leopard scats in the	78

1981 to They can eas the end to extend