

**CONSERVATION MANAGEMENT OF
THE KRUGER NATIONAL PARK
ELEPHANT POPULATION**

by

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*This thesis is dedicated to those who have
meant most to me in my life:*

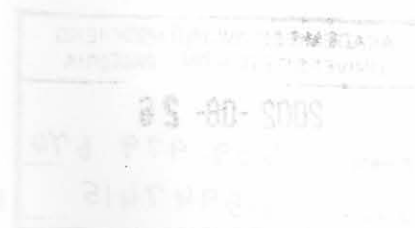
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ABSTRACT

Aspects of history, population dynamics, movement patterns and impacts of elephants *Loxodonta africana* on baobab *Adansonia digitata* trees were studied in Kruger National Park (KNP). Techniques of elephant contraception were reviewed and effects on behaviour were studied. Options for elephant population management were investigated through modelling.

Three sub-populations of baobabs had different size-class structures. This was thought to result from exposure to different densities of elephants both spatially and temporally. These differences were suggestive of low historical densities of elephants.

A literature review of the long-term history of the KNP elephant population until initiation of management also inferred low historical elephant densities. The recolonisation of the KNP by elephants subsequent to proclamation as a game reserve was documented.

The history of the elephant management era including fencing of KNP and the elephant management policy of the time is reviewed and documented. Aspects of the dynamics of the

population were studied from data collected at censuses and culls. Changes in rates of increase could be related to fencing and its effect on immigration and emigration.

A study of movements of radio collared animals showed that adult cows have distinct home ranges which are variable in size. Cows showed a high degree of fidelity to their home ranges. Culls induced movements but not beyond home range boundaries. Boundaries of management zones for a new elephant management policy were defined on the basis of these findings.

An analysis of census data examined the consequences of culling for the dynamics of the population. A distinct pattern in the rates of increase in culled sub-populations emerged. Densities declined in the year immediately following a cull but increased to significantly higher levels the year thereafter. This brought into question the effectiveness of culls in reducing elephant numbers in specific areas and the consequences for biodiversity. Changes in rates of increase may have resulted from intra-population movements rather than changes in demographic variables.

An overview is given of the broader issues of managing elephants and their local and global dilemmas. The logistics of implementing a contraception program were modeled showing that 75% of breeding cows must be under treatment to effect a stabilization of the population. A numerically simpler means of limiting population growth was identified. The killing or sterilization of 250 pre-breeding cows would achieve the same goal.

The new elephant management policy for KNP is documented. Expected population trends subsequent to the implementation of this policy are modelled. A personal evaluation of the policy is given.

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DISCLAIMER

This thesis consolidates into one document the results of research on the African elephant conducted by me and various respective co-workers. It was compiled from various published scientific papers and reports which were reworked into thesis format, but as a result, styles may vary between chapters. I testify that, except where otherwise acknowledged, the work in this thesis is my own, though it benefited from comments by my supervisor, co-authors, colleagues and referees.



I.J. Whyte

Skukuza, February 2001.

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