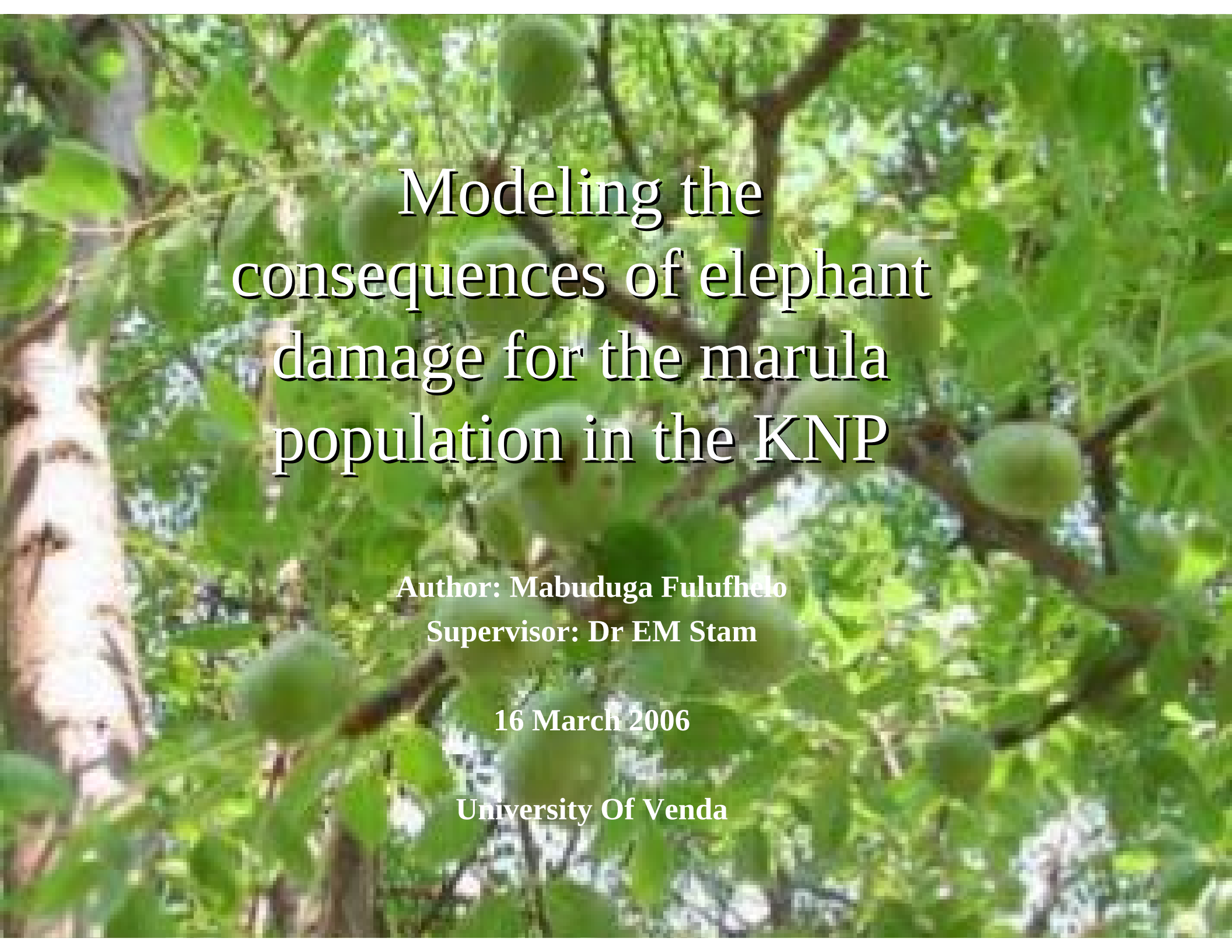

Modeling the consequences of elephant damage for the marula population in the KNP

Author: Mabuduga Fulufhelo

Supervisor: Dr EM Stam

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University Of Venda

More elephants counted In Park than last year

This year the elephant census crew counted 12 467 elephants in the Kruger National Park, compared to the 11 454 in 2004. Dr Ian Whyte, coordinator of the census, says the visibility was better this year due to fewer leaves on the trees, as compared to last year this time. In 2004, the census recorded a decrease in elephant numbers, with 218 animals less than in 2003. This was partly attributed to bad visibility, especially in the Mopani area. Some elephants were also thought to have moved into Mozambique.

The census is done annually during the last two weeks in August. The same method whereby the helicopter crew follow the rivers in the Park from the Limpopo in the North to the Crocodile River in the south has been used since the first census in 1967.

Ian conducted his first census in 1984 and has continued to do so every year until now.

"It is an absolute privilege to see the Park from the air every year," says Ian.

"What stood out this year was the abundance of natural water still found in the veld. Many of the smaller streams either still flowed or had pools of water," he said.

The elephant and buffalo count excludes the adjacent nature reserves such as the Associated Private Nature Reserves and Sabi Sands.

A buffalo count is conducted at the same time, but the figures had not yet been finalised at the time of going to print.

Grant Knight, Sanparks pilot, Johann Oelofse, section ranger at Mooiplaas, Dr Ian Whyte and Wouter Jordaan of conservation services.









- Elephant Density: When do we intervene?
- “Threshold of potential concern (TPC)”
- TPC: upper or lower limit for a selected environmental indicator, which, when it is reached, prompts one of two possible actions: a management intervention to moderate the cause of the transgression or a recalibration of the threshold
- Based on ‘best available knowledge’
- Need for prediction of longer term effects on marula population
- Predictions generated by models

Baxter & Getz model

- savanna model which includes the effects of fire and elephants on the tree/grass coexistence.
- currently predicts persistence or disappearance of woody vegetation in dependence of elephant density
- uses a single ‘model tree’ for its woody component
- uses a 1 km^2 patch of ‘representative savannah’ divided in 1 ha blocks

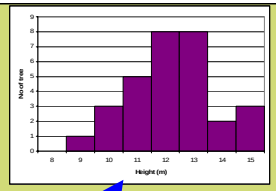
Our approach

- Parameterization of the Baxter / Getz model for marula
- Fieldwork to obtain life-history traits of marula
- Implementation of the model in a GIS-environment

Elephant densities

A B C

Initial marula distribution



A B C

Climatic conditions

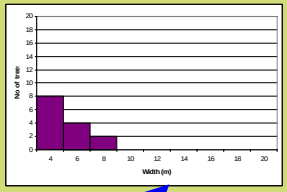
A B C

Marula parameters

- growth rate
- recruitment rate
- mortality

Baxter / Getz Model

A B C



Predicted marula distribution

Model run parameters

- time step: 0.5 yr
- period of simulation: 100 yrs
- size of grid cell: size of animal census blocks
- number of grid cells: number of animal census blocks

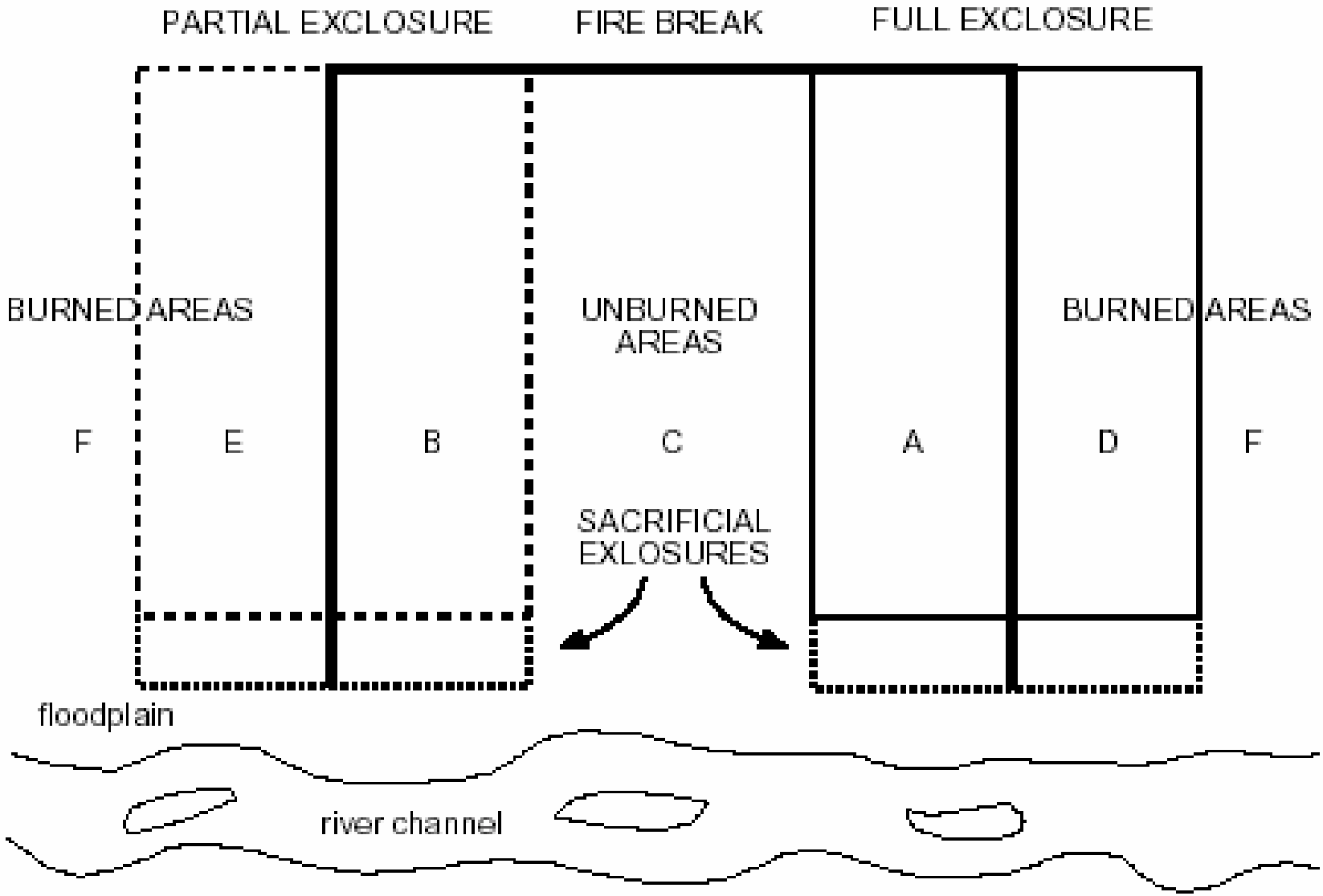
Databases used

- climate data
- basalt vs. granite
- elephant census data
- marula distribution / demography data

Fieldwork

- growth, recruitment, mortality, elephant damage rate
- two areas: the Nkuhlu exclosure (granite) near Skukuza and the buffalo enclosure (basalt) near Satara

SCHEMATIC LAYOUT AND TREATMENTS TO BE APPLIED TO THE EXCLOSURE SETS



Activities per tree

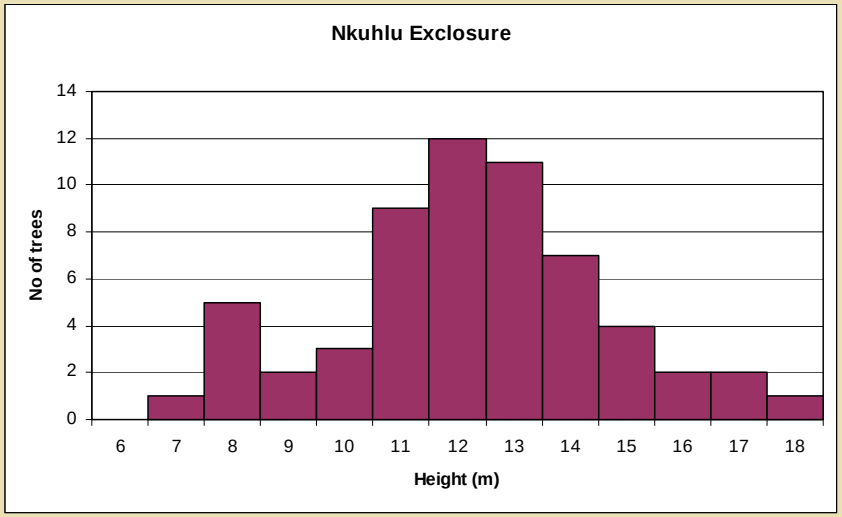
- GPS coordinates
- photographs from two fixed positions
- DBH and basal area
- elephant damage was assessed and photographed

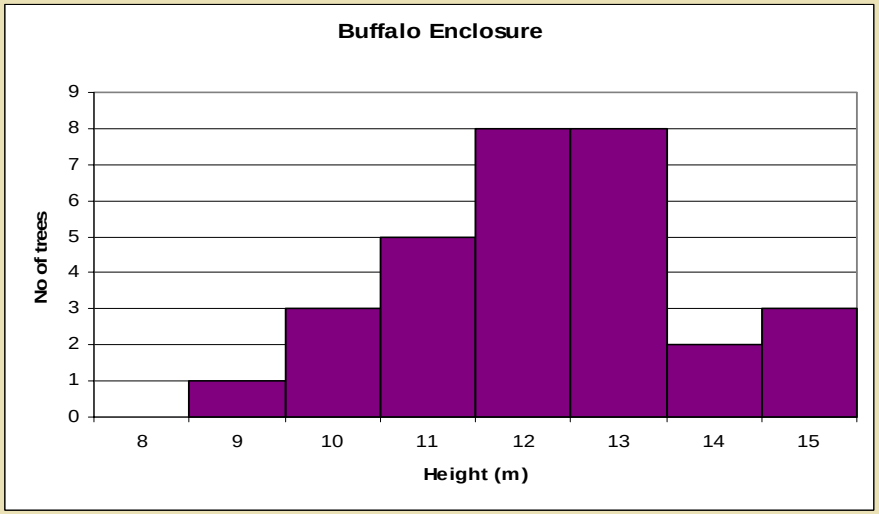
height, crown width and crown depth were determined on the photographs

- recruitment
  - only measured in buffalo enclosures
  - transects 20 x 100 m, 2 within and 2 outside the enclosure
  - seed/saplings counted, mapped and height measured

- period of project: 5 years during which the trees will be revisited every year

Preliminary results





- t-test: no significant difference in mean heights or widths
- wider range of sizes at Nkuhlu, could be effect of the Sabie river
- no small trees between sapling stage and 6 m in both areas, except two (1.2 and 1.8 m) in the buffalo enclosure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