



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

**The impacts of herbivores and humans on the utilisation of woody
resources in conserved versus non-conserved land in Maputaland,
northern KwaZulu-Natal, South Africa**

by

Jerome Yves Gaugris

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Centre for Wildlife Management
Faculty of Natural and Agricultural Sciences
University of Pretoria

Supervisor: Prof. Dr M.W. van Rooyen

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Disclaimer

I hereby declare all the work to be my own and that I have acknowledged all those that helped me and contributed in producing this thesis. This work has not been submitted previously at any other institution.

Jerome Yves Gaugris



CURRICULUM VITAE

Jerome Yves Gaugris was born in 1977 and grew up in Burundi in central Africa. He received his school education at the French School of Bujumbura, and then completed his undergraduate studies in Biology and Geology at the Université Blaise Pascal in Clermont Ferrand in France. He completed a MSc. in Cellular Biology and Physiology at this University before coming to South Africa in 1999 where he enrolled for a BSc. Honours in Wildlife Management at the Centre for Wildlife Management of the University of Pretoria, followed by an MSc., which he received with distinction in 2004. His dissertation investigated the sustainable utilisation of hardwood species in a rural community of Maputaland in South Africa.

Jerome has done a lot of research on vegetation and sustainable utilisation of plant resources in the Maputaland area, and published seven papers from his MSc., and another two are in review.

Jerome has travelled widely and is familiar with Wildlife Management in Europe, Northern America and Australia.



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Abstract

This study presents an exploration of the structure, dynamics and utilisation of woody plants in vegetation units of northern Maputaland. Animal (in Tembe Elephant Park) and human (in the rural community of Manqakulane) utilisation of woody plants were compared against a control area (Tshanini Community Conservation Area) where animals were extirpated and people were precluded through tribal rules.

The tree assemblages of the unique Sand Forest were explored, and compared with previous studies. A new classification was proposed and a new subcommunity was established. Contrary to previous studies, a gradient from Short to Intermediate to Tall Sand Forest was defined, and it was suggested that structurally different Sand Forest subcommunities represent a mosaic of different evolutionary states, rather than stationary states as perceived currently. Animal utilisation appeared to have transformed Sand Forest in conserved land to such an extent that it no longer resembled Sand Forest outside conserved areas.

The structure of Sand Forest and woodlands of the region was evaluated at the vegetation unit level (21 vegetation units), through a size and height class distribution analysis of woody plants. Humans and animals had clearly modified the woodlands and appeared to force succession from closed woodland to open woodland. The Sand Forest appeared to benefit from low intensity animal utilisation,



with increased diversity, and possibly enhanced dynamics. However, signs that current animal utilisation have negative effects were perceived.

The size class distribution of Sand Forest and woodland woody species was presented and an analysis of species grain was performed. The grain concept was successfully applied to woodland species for the first time. It appeared that nearly all vegetation units were fine-grained, and therefore governed by small-scale dynamics. Frequent small disturbances are necessary to maintain diversity. There was cause for concern that current animal and human utilisation threaten such fine-scale dynamics.

The utilisation level by the browsing mammals guild in Tembe Elephant Park and by small browsers and people in Manqakulane Rural Community were evaluated over two periods. Small to medium browsers utilised more woody species and height classes than any other agent, but with short-term effects. However, utilisation marks linked to elephants and people were accumulating significantly, and the long-term effects of these agents were threatening the dynamics of Maputaland vegetation.

The case of woody species utilisation by elephants was evaluated further and compared with a previous study. Overall utilisation by elephants reached 100% of individuals for several woody species, while other species' regeneration potential was severely threatened. Woody species preferred in 1994 were nearly extirpated. Utilisation of woody species by elephants throughout Tembe Elephant Park appeared correlated with distance to permanent water points during a dry spell.

In conclusion, it appeared clear that policies in favour of high animal numbers in formally conserved areas were not suited for northern Maputaland and this result should be considered when the expansion of the South African protected areas of Maputaland into Mozambique becomes effective. Community-based conservation appeared promising, but novel ways of generating income should be investigated.