Botanical assessment of the Apiesrivierpoort Forest

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Executive Summary

The specific conservation objectives of Marakele National Park are to maintain biodiversity and ecological processes, with the emphasis on red data taxa, megaherbivore and large carnivore interactions. The main aim of Van Staden study in 2002 was therefore to describe and map the plant communities of the Marakele National Park, in order to conserve and manage the Park's biodiversity and ecological processes. Four forest plant communities were described that belong to the Marakele Afromontane Forest. With a site visit by Department of Water Affairs and Forestry it was confirmed that one of the Forests was unique and special. It has not been described before, and the composition of plant species has not been found in any other forest in the country. The structure, ambience and dynamics of this plant community are truly that of a natural

forest. Thus although the forest might be very small (6.9 ha), it is unique in the sense of plant species composition and micro-habitat.

Introduction

Marakele National Park (MNP) is one of the more recently established national parks in South Africa, having been proclaimed in 1994. It is situated in the southwestern corner of the Waterberg in the Limpopo Province, South Africa. The specific conservation objectives are to maintain biodiversity and ecological processes, with the emphasis on red data taxa, mega herbivores and large carnivore interactions. Since having been proclaimed, MNP has become an important preserve for rare and endangered species such as the Cape Vulture (*Gyps coprotheres*), Black Rhinoceros (*Diceros bicornis*), the Roan Antelope (*Hippotragus equines*) and the Waterberg Cycad (*Encephalartos eugene-maraisii*).

In order to manage and conserve any conservation area or national park, a profound knowledge of the ecology is a prerequisite, and to achieve that prerequisite, an inventory of the biotic and abiotic components of the different ecosystems have to be studied and managed on a scientific basis. The prevention of increasing loss of biodiversity (species and plant communities) is a daunting challenge facing the world today. Humans continuously alter their environment to suit their needs resulting in a large number of ecosystems being destroyed annually. The establishment of protected areas within which ecosystems are conserved, is seen as a solution to the prevention of ecosystem loss (Brown & Bezuidenhout 2005). In order to be able to manage and conserve our natural heritage for current and future generations a profound knowledge of the different ecosystems is a prerequisite, and to achieve that prerequisite, an inventory of the biotic and abiotic components of the different ecosystems should be studied and managed on a scientific basis (Van Staden 2002).

A description of the vegetation, a vegetation map, and a plant species list of the southern section of MNP was prepared as baseline information to initiate a long term study on the

vegetation dynamics in the park (Van Staden 2002). In this study, Van Staden (2002) has also identified rare, unique and threatened plant communities.

Van Staden (2002) described four forest plant communities in Marakele National Park which strongly relate to the Waterberg Mountain Bushveld (SVcb17) described by Mucina and Rutherford (2006). The National Forest type classification done by Department of Water Affairs and Forestry (DWAF) identified 26 Forest types in South Africa. The four Forest plant communities identify by Van Staden (2002) were classified as belonging to the Marakele Afromontane Forest (Mucina & Van Staden 2003).

In separate discussions held with Prof Laco Mucina (Co-Author of Vegetation Map of S.A., Lesotho and Swaziland) and Mr Izak van der Merwe (DWAF representative: Conservation and Sustainable management of natural forest) (*pers comm*. 2008) concerning the status and threats to the Marakele forest plant communities it was discovered that one of the described forests of Van Staden (2002) does not fit into any of above 26 forest types and although very small, it is unique in terms of species composition and the specific habitat.

This report will give the detail of the importance of the botanical unique plant community.

Study area

The Forest occurs east of the Tlopi tented camp, which is situated on the dam southern edge of the Apiesrivierpoort Dam (Fig. 1).

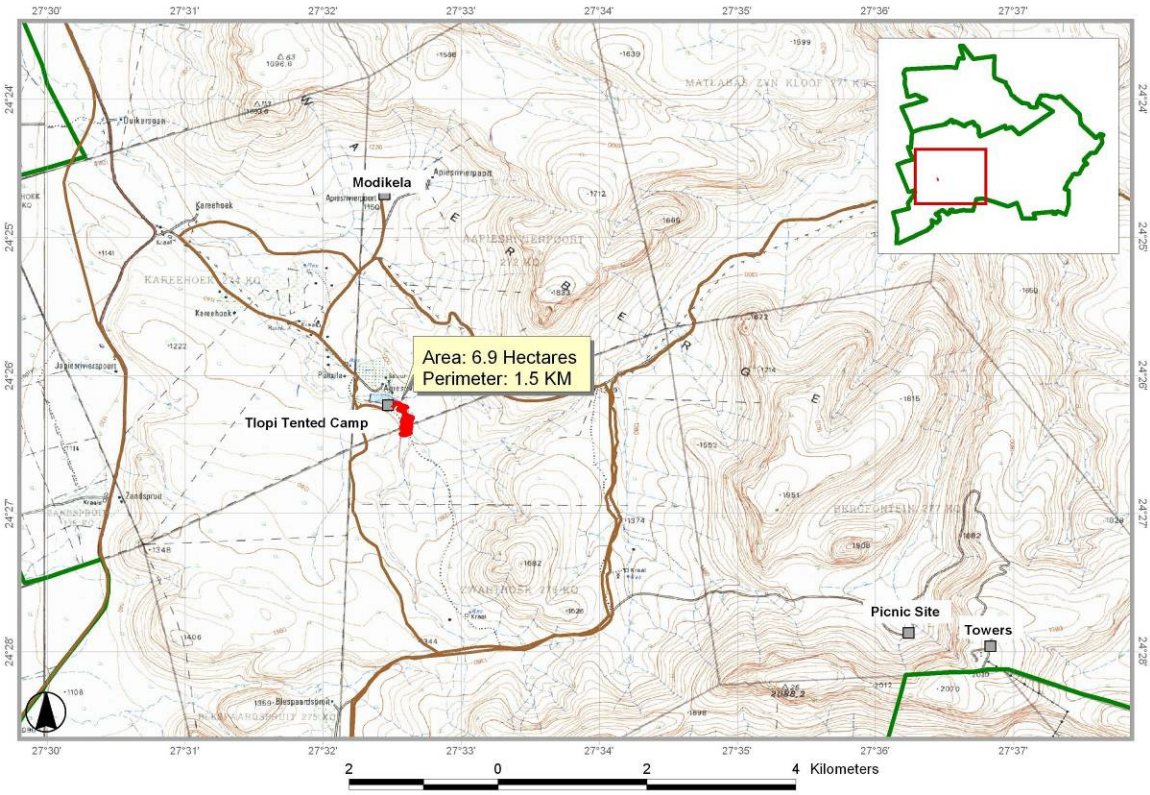

Figure 1: Location of the Forest in Marakele National Park (Me Sandra MacFaden).

The size of the Forest is 6.9 ha and has a perimeter of 1.5 km (Fig. 2).

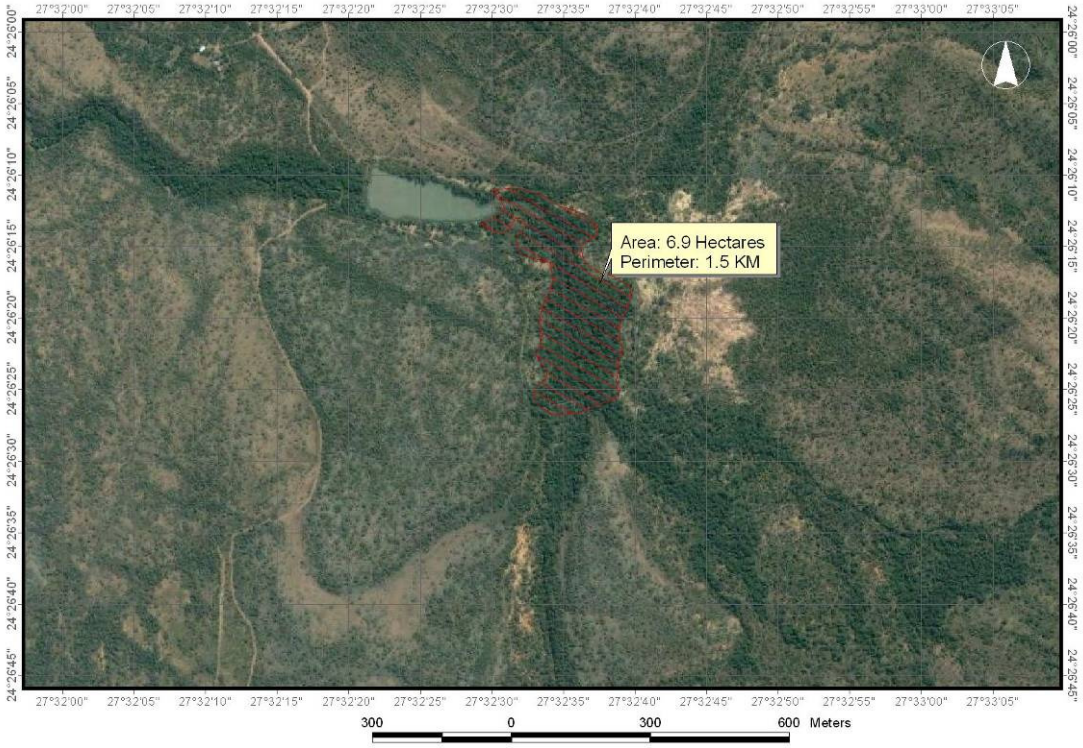

Figure 2: The bird view of the Forest near the Tlopi Tented camp (Me Sandra MacFaden)

The park is situated in the Savanna Biome. This biome is the largest biome of South Africa and occupies over one third of South Africa (Low & Rebelo 1996). Though this biome is extending from sea level to areas above 2 000 m above mean sea level (amsl), MNP mostly lies between 1000 – 2 100 m amsl (Van Staden 2002). According to Acocks (1988), the area can be classified as Mixed Bushveld (18), Sourish Mixed Bushveld (19), Sour Bushveld (20) and North-Eastern Mountain Sourveld (8), whereas Low & Rebelo (1996) classifies the area as the Waterberg Moist Mountain Bushveld (12) and the Mixed Bushveld (18). Mucina and Rutherford (2006) recognized three vegetation units in Marakele National Park namely: (1) Waterberg – Magaliesberg Summit Sourveld (Gm29 – Grassland Biome), (2) Western Sandy Bushveld (SVcb16 – Savanna Biome) and (3) Waterberg Mountain Bushveld (SVcb 17 – Savanna Biome).

Methods

Total floristic composition was noted for two sampling plots (Relevés 96 and 97, Van Staden 2002). Sampling was done by means of the Braun-Blanquet method of vegetation survey (Mueller-Dombois & Ellenberg 1974). Braun-Blanquet cover abundance values were assigned to all plant species encountered in the relevés. Plant species identification was done according to Germishuizen & Meyer (2003) (Table 1). Soil classification is according to the Soil Classification Work Group (1991). The structural classification for this study was based on the broad scale structural classification of Edwards (1983).

The following habitat information was recorded: geology, soil forms, climate, altitude, slope, aspect and the rockiness of the soil surface of each relevé and was qualitatively described. This information was used in the description of the different plant communities. The coordinates of each relevé was determined and noted with the use of a GPS.

A site visit was arranged with DWAF representatives and SANParks officials, to discuss and survey the Park to assess the status of the forest plant communities (Appendix A).

Results

Results of Van Staden (2002)

Berchemia zeyheri – Olea europaea Forest

The *Berchemia zeyheri – Olea europaea* Forest is found on the floodplain between two drainage lines east of the Tlopi Tented Camp. The soil texture is sandy-clay with Clovelly and Oakleaf as the dominant soil forms.

The woody layer is prominent with the trees between 5 – 15 m tall covering 90% of the area, whilst the shrubs (1,5 – 2,5 m tall) covering less than 8 % of the area. The herbaceous layer is not very prominent with a cover of less than 2 % and between 0,5 – 1,0 m tall. No rocks on the soil surface were recorded.

The diagnostic species for this Forest community are the trees *Celtis africana, Maytenus undata, Schotia brachypetala, Chaetacme aristata, Mimusops zeyheri, Olea europaea* subsp. *africana, Syzygium guineense, Tricalysia lanceolata, Carex spicato-paniculata, Suregada africana, Acokanthera oppositifolia, Pappea capensis* and the shrubs *Diospyros whyteana* and *Calpurnia aurea* (Table 1).

Van Staden (2002) described two communities, the *Olea europaea* subsp. *africana* - *Calpurnia aurea* Tall Closed Woodland and *Diospyros whyteana -Calodendron capense* Forest, which strongly relates to the described community.

Site visit of DWAF

During the visit a small unique forest was found between two drainage lines with a species composition quite different from the other forest sub-communities in MNP. Some plant species like *Olinia rochetiana* has not been found in this region before. The structure, ambience and dynamics of this plant community are truly that of a natural forest (Appendix A).

Discussion and Conclusion

This forest sub-community has not been described before, and the composition of plant species has not been found in any other forest in the country (Appendix A). This was also confirmed by Mucina (*pers. comm*. 2008). Thus although the forest might be very small 6.9 ha, it is unique in the sense of plant species composition and micro-habitat.

It is important to note that short-term results indicate changes in plant species composition, growth forms and height classes in the forest. The impact of large herbivores has changed the physiognomy of the vegetation resulting in the Forest being converted to closed Woodland. This has a positive implication in that a higher diversity of plant species was recorded in the forest. However, it has negative implications for the microhabitat of the forest. Rare, endangered plant and animal species are therefore threatened by the modification of the plant community-cum-habitat. Suggestions how to address above will be made in another internal report which is currently *in prep*.

Acknowledgements

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Table 1: Alphabetical list of plant species that was recorded by Van Staden (2002).

Abrus precatorius
Acacia robusta
Acokanthera oppositifolia
Asparagus virgatus

Berchemia zeyheri
Calodendron capense
Calpurnia aurea
Carex spicato-paniculata
Carissa bispinosa
Cassinopsis ilicifolia
Celtis africana
Chaetachme aristata
Cryptolepis transvaalensis
Cussonia paniculosa
Diospyros whyteana
Euclea natalense
Euphorbia ingens
Ficus sur
Grewia flavescens
Grewia occidentalis
Gymnosporia polyacantha
Maytenus undata
Mimusops zeyheri
Ochna holstii
Olea europaea subsp. *africana*
Pappea capensis
Podocarpus latifolius
Rhus leptodictya
Schistotephium heptalobum
Schotia brachypetala
Scolopia zeyheri
Suregada africana
Syzygium guineense
Tricalycia lanceolata
Vepris lanceolata
Zanthoxylum capense

Appendix A

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BY FAX:
Dr M D Mabunda
Chief Executive Officer
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PRETORIA
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Dear Dr Mabunda

THREATENED FOREST IN MARAKELE NATIONAL PARK

The mandate of the Department of Water Affairs and Forestry (DWAF) includes the conservation and sustainable management of natural forests. DWAF sincerely appreciate the important role played by SANParks in protecting natural forests in various National Parks.

Forest scientists from DWAF visited the natural forests in Marakele National Park on 17 September 2008, together with Dr Hugo Bezuidenhout of SANParks. The aim of the visit was to look at the structure and species composition of these forests, and to determine whether there are unique features which may necessitate the revision of the national forest type classification assigned to these forests.

The national forest type classification of 26 forest types identifies the forests occurring here as belonging to the Marakele Afromontane Forests, with three sub-communities. During the visit a unique small forest of a few hectares was found along a low-lying drainage line with a species composition quite different from the other forest sub-communities in the National Park. This forest sub-community has not been described before, and the composition of species has not been found in any other forests in the country. Some tree species like *Olinia radiata* has not been found in this region before. The structure, ambience and dynamics of this plant community are truly that of a natural forest. As you are probably aware, national forests has special protection under National Forest Act and are also valued for biodiversity reasons, not only for the species that occur there but also for plant communities, which is the unique feature of this forest.

During the site visit extensive damage from elephants were found, with many trees destroyed or damaged. Study sites with photographs before and after the introduction of elephants also shows severe changes in the ground and herb layers (please see attached photographs). This damage impacts on the forest structure, and at the current rate of degradation the forest will surely be destroyed within the next five to ten years. The rare Delagorgue's pigeon once found here has already disappeared. Urgent steps are therefore needed to prevent further damage by elephants.

It is proposed that an elephant-proof fence be erected which will still allow small game to enter the forest (which are necessary to maintain the ecological equilibrium which existed before elephants were introduced).

Your attention to this matter will be highly appreciated.

Yours Sincerely

Director- General
Department of Water Affairs and Forestry