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Vegetation ecology of the Nooitgedacht section of Loskop Dam Nature Reserve, Mpumalanga

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ABSTRACT

Vegetation descriptions and maps derived from vegetation classification exercises are important management tools for conservation managers in protected areas. This study classifies, describes, and maps the vegetation of a recently acquired area, the Nooitgedacht section of Loskop Dam Nature Reserve. Nooitgedacht is unique in that it resembles Bankenveld vegetation and differs from previously described areas in the reserve. The Braun–Blanquet approach was used for classifying the different plant communities. A total of 170 sample plots (100 m^2) were placed in all homogeneous vegetation units in a randomly stratified manner. Plant species and various habitat variables were recorded for each plot. Plant community data were analysed using the JUICE software package. A modified TWINSPAN classification was done to classify the different plant communities in the study area. 11 plant communities, grouped into seven major groups, were identified. These plant communities are distributed across open and closed woodlands, grasslands, and wetland areas. Four new plant communities were identified for the reserve. Results indicate that plant communities 5 and 6 have the highest species diversity and should be managed to prevent loss of diversity. A vegetation map of the identified plant communities was produced using ArcGIS.

1. Introduction

Vegetation classification and mapping are widely used tools for the interpretation and description of natural ecosystems and habitats (Brown et al., 2013). These tools are used to facilitate decision making for the management of protected areas (Bredenkamp and Theron, 1978). According to Rouget et al. (2004), information derived from the classification of vegetation provides a good representation of the biodiversity found in an area since most animals, birds, insects, and other organisms are associated with particular plant communities.

Loskop Dam Nature Reserve (LDNR) is one of the largest and oldest reserves in the Mpumalanga province and is currently managed by the Mpumalanga Tourism and Parks Agency (MTPA) (Ferrar and Lötter, 2007). The reserve was established in 1942, proclaimed as a nature reserve in 1954 (Eksteen, 2003), and subsequently expanded through the occasional incorporation of additional farms. The current size of LDNR is 23,175 ha (Ferrar and Lötter, 2007). LDNR lies on the transition zone between the Grassland and the Savanna biomes (Eksteen, 2003). Vegetation on higher lying areas is typical of the grassland biome, while the lower lying areas represent the Savanna biome (Eksteen, 2003; Mucina and Rutherford, 2006). According to Acocks (1988), veld types represented on the reserve include Mixed Bushveld (Veld type 18), Sourish Mixed Bushveld (Veld type 19), and Bankenveld (Veld type 61). Mucina and Rutherford (2006) provide a more refined description of the LDNR vegetation and suggest that the two main veld types occurring on the reserve are Central Sandy Bushveld (SVcb12) and Loskop Mountain Bushveld (SVcb13).

Theron (1973) undertook the first detailed vegetation classification and description for the original reserve. The Parys and Rietfontein sections of the reserve were later added to the northeastern boundary of the reserve and were classified and mapped by Götze et al. (1998). The Hondekraal section (3347 ha) was incorporated into the reserve during the 1990s and a vegetation classification and description was undertaken by Filmalter (2010). This study classifies, describes, and maps the plant communities of the Nooitgedacht section.

The aims of this paper were

i. to identify and describe the floristic composition of the various plant communities found in the study area
ii. to classify the different plant communities according to the dominant plant species occurring in them
iii. to map the plant communities

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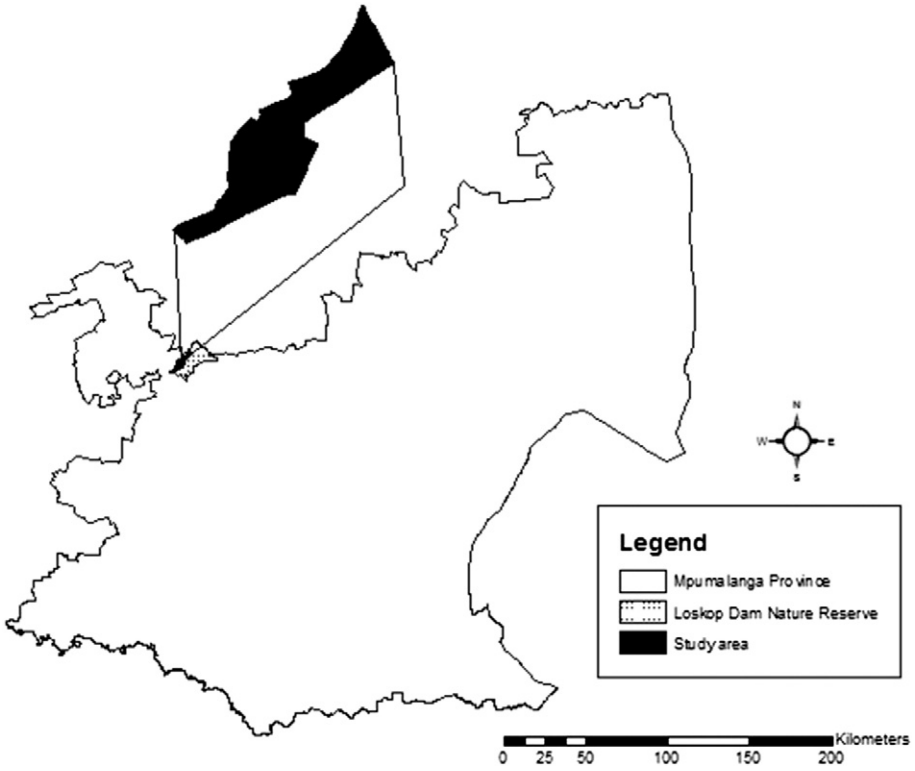

Fig. 1. Location of the study area in Loskop Dam Nature Reserve, Mpumalanga.

2. Study area

Loskop Dam Nature Reserve is situated in Mpumalanga province, approximately 55 km North of Middelburg in the Olifants River valley at latitude 25°22′ to 25°31′ South, and 29°10′ to 29°24′ East (Fig. 1). The Nooitgedacht section covers approximately 4457 ha and is located on the northwestern boundary of the reserve (Fig. 1).

LDNR occurs in the summer rainfall region of South Africa and has warm to very hot summers with moderate winters. Rainfall occurs mainly as showers and high intensity thunderstorms, often accompanied by severe lightning and strong, gusty, southwesterly winds. The majority of rainfall occurs during the hot summer months (November to April). The mean long-term rainfall (2004 to 2014) for LDNR is 650 mm per annum. Rainfall and temperature data for the study period (2010 to 2012) were collected at a weather station located at the reserve's main office (Fig. 2).

The Nooitgedacht section occurs on the higher lying areas of the reserve and resembles typical grassland vegetation. Soils are predominantly shallow interspersed with prominent rocky outcrops, while deeper soils occur in lower lying areas. Land types describe the different soil and climate patterns for an area (Fitzpatrick et al., 1986). Mucina and Rutherford (2006) defined a land type as a map unit that can be mapped at 1:250,000 scale. Land types identified in the study area include Fa7, Ib17, Ib10, and Ib13. Fa7 and Ib10 land types occur on shallow soils with underlying hard rock or fractured and weathering rock material; lime is rare or absent (Land Type Survey Staff, 1988). Ib10

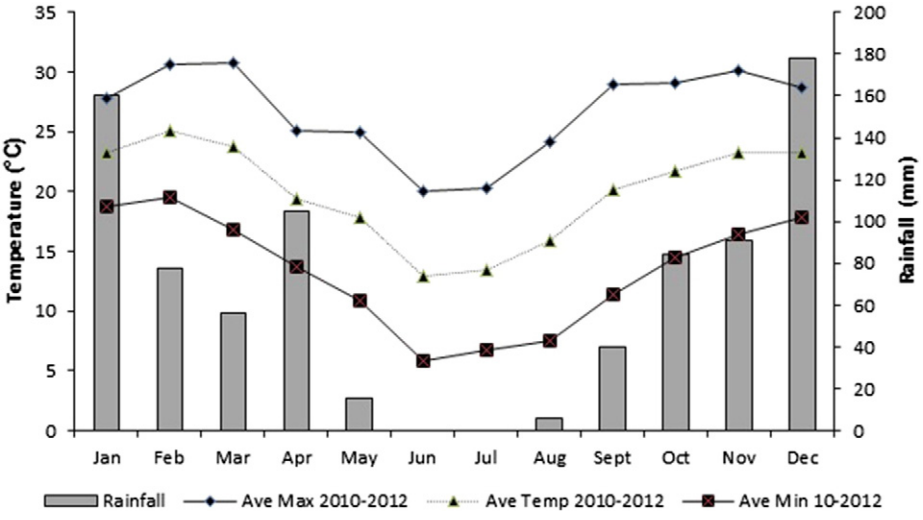

Fig. 2. Rainfall and temperature data for the study period.