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Mapping and quantifying the impact of grazing around water points in a small semi-arid savaana game reserve

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ABSTRACT

The widespread provision of water points in protected areas in semi-arid savannas has supported associated increases in cumulative grazing pressure. This study addresses the management implications of artificial water provision which causes the development of grazing gradients of increasing herbivore impact at artificial water point sites. The aim of the study was to map and quantify the impact of grazing and trampling at water points sites in a 4 600 ha sized semi arid savanna game reserve (Mafikeng Game Reserve in the North West Province).

Aerial photographs and SPOT imagery were used to identify the extent of the sacrifice zone for the period before the reserve was established (1980), and after establishment (2003 and 2009). To quantify the herbaceous species, relative percentage frequency and composition, the frequency of occurrence of species at water point sites was measured along four 100 m transect following cardinal directions (north, east, south, west). Furthermore, Landscape Function Analysis (LFA), which uses indicators that can be assessed rapidly to determine the functional status of the rangelands, was applied. The landscape zones or cover types were related to 10 distance categories within a 100 m transect.

The results indicate the increasing extent of the sacrifice zone since the provision of the artificial water points. The water points that are situated away from the river were characterized by Increaser II species. Increaser I and Decreaser species characterized water points which are situated along the river. Species composition was influenced by environmental variables such as soil type and depth and the spatial location of water points in relation to natural water source. The results of the study suggest changes in plant composition and soil cover that are probably related to accumulated long-term loss of herbaceous vegetation cover around water points, with special emphasis on water points that are situated away from the natural water source in the central part of the reserve. This part of the reserve attracts higher concentrations of animals probably due to the water points, which causes loss of herbaceous vegetation.

In order to minimize degradation of the areas surrounding water points in the central part of the reserve, the rotational opening and closing of water points situated away from the river should be explored, based on the system change, to allow vegetation recovery. Also, the non-operating water point near the natural source should be opened in an attempt to attract animals to underutilized areas, to allow uniform desirable utilization of the entire reserve, taking the reserve's objectives into account.