

# SAVANNA SCIENCE IN SOUTHERN AFRICA

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In March, 2019 I attended the annual Savanna Science Networking meeting held in Kruger National Park. This meeting provides an opportunity for scientists to share their latest research findings conducted in national parks and other conservation areas within the savanna biome. This includes numerous research projects from conservation areas mostly within South Africa (with Kruger National Park the best represented), but also drawing in relevant research and understanding from other savanna protected areas across the globe, including Australia, South America, USA and Asia. The conference is also an important forum for dialogue and debate about ecological science and conservation matters; and a pivotal point for future research collaborations. There are only plenary sessions and each speaker presents their research to an audience of 500-700 people.

The research I presented focuses on the linkages between woody savannas and animal diversity. Savannas are increasingly threatened by anthropogenic forces that are causing broad-scale directional shifts in woody vegetation that homogenizes their structure. Yet, whether animal

communities respond consistently to changes in woody vegetation in savannas, particularly in terms of the effects of spatial scale, remains poorly understood. We addressed this gap by testing for changes in birds, bats and terrestrial small mammals across a gradient of woody cover in the savannas of southeastern Africa for two years at multiple spatial scales. We found that homogenization of vegetation structure corresponded with decreases in animal richness, diversity and functional diversity. Additionally, metrics of animal diversity declined at opposing ends of a canopy cover gradient (<10% and >65%), where we found distinctly different animal assemblages. These patterns were consistently more pronounced on a broader grid scale (30.25 ha) when compared with the plot scale (0.25 ha). The broad-scale reductions in the diversity and functions of animals observed may be indicative of reductions in the resilience, stability and ecosystem function of tropical savannas. Our results suggest that conservation and management aimed at promoting heterogeneity at broad scales may be critical for maintaining diversity and functionality in savannas.

While at the conference I met with many African collaborators, including South African National Parks, the University of Swaziland, the University of Witwatersrand and the University of Cape Town. Together we recently established a long-term multi-collaborator project to understand the influence of varying levels of elephant activity on the diversity and health of savannas. To conduct this research, we have created research plots where elephants are always excluded with elephant proof fencing, plots where elephants have free range, and plots where elephant access is limited through the opening and closing of fences. This research is critical to understand how variations in elephant activity can lead to extremely different marked changes in savanna health. Additionally, I met with my graduate student Zoe Nhleko. Zoe works for Kruger National Park and is examining the changes in white rhino populations from the current poaching epidemic. After the conference Zoe and I designed an experiment to understand how rhinos respond to non-lethal exposure to human disturbance.

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