



SOUTH AFRICA DISSERTATION/THESIS PROJECT

SA87 Assessing predator-prey interactions in Dinokeng Game Reserve

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Introduction

The image quality, battery life and processing software of remotely-triggered camera traps have all improved greatly in recent years, while the cost has dropped dramatically. This has led to a move of many scientists and organisations into developing camera trap projects as a non-invasive monitoring tool. Camera traps can operate 24 hours a day and, if using a black flash, will not disturb wildlife in the process. This means that camera trapping is a low effort, high reward method of data collection, particularly when assessing rare, elusive or nocturnal species.

In June 2018, Opwall and our South African partners Wildlife and Ecological Investments (WEI) began a long-term camera-trapping project in Dinokeng Game Reserve. This reserve was created by multiple land-owners contributing their land to allow space for wildlife and to benefit financially. Many landowners still live within the reserve or own commercial property within it. Some landowners opted to not join the reserve, and so effectively became island properties within the reserve that have other land-uses. This creates a busy reserve with a complex spatio-temporal mosaic of human activity and disturbance. The wildlife within Dinokeng is therefore under pressure from this human disturbance. It might be expected that their movement, habitat utilisation and general interactions could be negatively impacted. However, wildlife numbers in Dinokeng are high and populations appear to be in good health. Understanding how dynamics of both prey and predator species are influenced by the unique Dinokeng situation is important for applied conservation efforts in an ever increasingly human-impacted world.

By using camera traps in Dinokeng, we can assess the occurrence, distribution, and behaviour of assemblages of species (such as small herbivores, megaherbivores, meso-carnivores and apex predators) across space and time. A carnivore assemblage may be expected to vary based on human disturbance, prey availability, habitat type and habitat fragmentation. All these factors vary noticeably within the core region of Dinokeng where our camera traps are based. The same may be true of prey species which may be expected to respond to the same set of factors, but with presence of predators replacing prey availability. These assemblages may vary temporally due to season or peaks in human activity. Understanding exactly how all these factors fit together to explain variation in presence/absence of rare and endangered species is vitally important for effective management of wildlife in close proximity to human settlements. Finding out what conditions benefit certain species or groups of species has the potential to inform changes in reserve structure and developments made in the future.

Methods

We have over 30 cameras active in Dinokeng year-round. The majority are focussed around the central hub of the reserve, where human activity is at its highest. Due to the high density of both human and wildlife populations we can record thousands of photos per week, giving a huge potential dataset. Processing of these images takes time, and students will need to spend time in camp each day categorising the incoming images. Fortunately, this process is made more efficient due to the bespoke image processing software recently developed by WEI with our specific long-term research aims in mind. WEI-Wildlog is a streamlined and intuitive program, which allows our students to identify all animals in thousands of photos in short periods of time contributing to a huge and continuous data set. Many of the major prey species such as impala, wildebeest and zebra are seen commonly on our cameras, meaning species associations and home ranges can be assessed. Small predators such as caracal, genet, serval, honey badger and many others have all been spotted on our cameras, as well as larger carnivores such as cheetahs and lions.

We will also measure many key characteristics of the camera trap locations, including predominant vegetation, visibility at site and proximity to human disturbance. These factors can all affect both visitation and, importantly, detection rates and so can be used to model occupancy of many of the key species of interest.

While our main focus is predator-prey interactions, the wealth of data available means we are hoping for a range of different questions that delve into different aspects. You therefore have the opportunity to decide exactly how you wish to utilize this data, combining what is available to produce an interesting and relevant research question.

Generally, your expedition will be divided between field and camp activities, with the majority of time spent in the field. During time in camp, students will be expected to attend lectures and practicals on African conservation and complete project data entry. The data collected by students is part of a long-term population monitoring and land management project and thus all students joining the Opwall expedition to Dinokeng Game Reserve are expected to assist with all data collection rather than focussing only on the data required for their project. In exchange for assisting the reserve management, students will have access to historical data sets from the reserve and may use them for their research projects.

Example questions that can be asked for this project

These are some examples of the types of questions that can be answered in this project and serve as a guideline only.

1. Are black-backed jackals and hyenas as scavengers found more frequently near lions than not?
2. Do different herbivore species such as wildebeest and zebra occur more frequently together in denser habitats where they are at greater risk of predation?
3. Are more shy and elusive predators such as African civet, brown hyena and serval found at specific times and areas that are less disturbed by human presence?
4. Is there a difference in alert behaviour (head raised vs head down) in impala near dawn and dusk related to predation risk, or during periods of heavy vehicle traffic?
5. Does occupancy of kudu change over the seasons and is it related to any environmental variables?

Recommended Reading

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