

# SA75 Assessing human-wildlife conflict in Dinokeng Game Reserve

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## Introduction

Dinokeng Game Reserve is a newly established Big 5 Game Reserve that was formed with the objective of establishing a premier tourism destination close to urban Gauteng. The Reserve is based on a novel conservation concept where the reserve was formed by multiple private and state landowners who joined their land in a conservancy. Some landowners opted to not be part of the reserve, and so were fenced out, effectively forming island properties within the reserve where multiple land-use such as agriculture, residential and light industry takes place (Figure 1). The reserve also borders the town of Hammanskraal with high poverty rates, and there have been human incursions into the reserve and meat-poaching. The reserve is continually expanding and dropping fences with neighbouring properties, but there remains over 200km of perimeter and internal fencing which sees many fence breaks. There are also public access roads in the reserve which see high traffic volumes and associated road-kill. Operation Wallacea and its local partners, WEI, have begun a Human-Wildlife Conflict (HWC) research project to look at the various ways the unique Dinokeng situation can lead to potential conflict, and how best to mitigate it. There is a need to quantify the rates of fence-breaches, both by humans, and animals, and the potential risks to the reserve, such as escaped animals and poaching. The need to determine how animals utilise the landscape in relation to humans is imperative. Dense settlements may deter certain animals such as large herbivores but provide protection from predators for smaller herbivores.

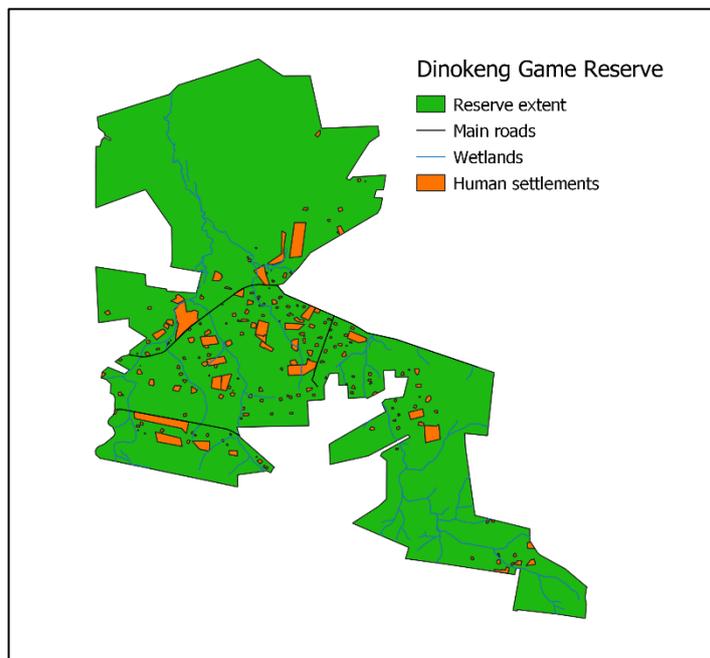


Figure 1. Map of Dinokeng Game Reserve including main roads, wetlands and human settlements.

Students will have access to a variety of data sets which can be taken in isolation or combined to answer the desired research question. Since 2016, our research teams have been collecting distribution data on large mammals to assess the potential for conflict, and opportunities for animals to seek refuge from densely populated areas. This is achieved using two methods: game transects and camera traps. The game transects run on set routes through the reserve and record species, location, number of individuals and group composition. This data collection is based on standard Distance analysis (see further reading for more information). There is also a series of camera traps set up both along the main roads in the reserve and in the central, most densely-populated area to look at how elusive, nocturnal species are utilising these zones. Alongside these, students will also be conducting spatial data collection to inform a database of human settlements and land-use. This data will include information on fence type, fence height, presence of water etc. In addition, teams will collect detailed vegetation data throughout the reserve to understand how animals utilise different parts of the landscape in relation to vegetation as opposed to human disturbance. The vegetation surveys include density and diversity of woody species, grass volume and measured impact on woody plants from specific herbivore species, such as elephant and rhino.

Students will be able to select their specific research question by bringing together multiple data sets to make comparisons between a range of factors. There is therefore a large degree of flexibility in this project for students to focus on their particular area of interest.

## Research Design

Students time will be divided between field and camp activities, with the majority of the time spent in the field. During time in camp, students will be expected to attend lectures and practicals on African conservation and complete their 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 pitch in and assist with all data collection rather than focussing solely on the data required for their project. In exchange for assisting the reserve management with their conservation project, students will have access to historical data sets from the reserve and may use them for their research projects.

## Recommended Reading

Buckland, S.T., Andersen, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., & Thomas, L. 2001. Introduction to Distance Sampling: Estimating Abundance of Biological Populations. Oxford: Oxford University Press.

Hayward, M.W. and Kerley, G.I., 2009. Fencing for conservation: Restriction of evolutionary potential or a riposte to threatening processes?. *Biological Conservation*, 142(1), pp.1-13.

Kioko J, Muruthi P, Omondi P & Chiyo P 2008. The performance of electric fences as elephant barriers in Amboseli, Kenya. *South African J of Wildlife Research* 38(1): 52–58

Kioko, J., Kiffner, C., Jenkins, N. and Collinson, W.J., 2015. Wildlife roadkill patterns on a major highway in northern Tanzania. *African zoology*, 50(1), pp.17-22.

Vanak, A.T., Thaker, M. and Slotow, R., 2010. Do fences create an edge-effect on the movement patterns of a highly mobile mega-herbivore?. *Biological Conservation*, 143(11), pp.2631-2637.

Collinson, W.J., Davies-Mostert, H.T. and Davies-Mostert, W., 2017. Effects of culverts and roadside fencing on the rate of roadkill of small terrestrial vertebrates in northern Limpopo, South Africa.

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Yiu, S.W., Keith, M., Karczmarski, L. and Parrini, F., 2015. Early post-release movement of reintroduced lions (*Panthera leo*) in Dinokeng Game Reserve, Gauteng, South Africa. *European Journal of Wildlife Research*, 61(6), pp.861-870.

Hoare, R., 2012. Lessons from 15 years of human–elephant conflict mitigation: management considerations involving biological, physical and governance issues in Africa. *Pachyderm*, 51, pp.60-74.