



## SOUTH AFRICA DISSERTATION/THESIS PROJECT

### SA89 Assessing the ranging patterns and habitat use of large mammals in Gondwana Game Reserve

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With over 9000 vascular plant species, the Cape Floral Kingdom forms one of the world's biodiversity hotspots. Fynbos and renosterveld once dominated the area but land transformation driven by agriculture have now restricted intact fynbos to smaller pockets surrounded by human-dominated landscapes. The desire to protect and restore these amazing habitats led to the formation of Gondwana Game Reserve in the Western Cape. This 11,000ha reserve was formed by bringing together land with multiple prior uses, meaning some areas are old pastures that are in the process of restoration. To attract more tourism to the reserve, and therefore prevent the reserve returning to agriculture, many game species have been introduced including elephants, rhino, buffalo and zebra. However, the nutritional value of fynbos and renosterveld are very low, so the management are currently maintaining some areas of the reserve as grassland to provide food for these species. How these large herbivores use this rather unique environment is very poorly understood, and so it is the aim of this project to shed some light on the ranging patterns, browsing levels and habitat usage of the large mammals in the diverse habitats within the reserve.

Large mammal populations will be monitored via game vehicle using distance sampling (Buckland et al 2001) along pre-determined line transects that coincide with reserve road network. The transect lines in total will incorporate all of the different habitat types (some transects will cover only one habitat type while others will cover multiple habitat types). Each transect will be sampled a minimum of three times. Students will travel along the transect line and a steady pace and record their encounters with herbivores. Each time an animal is seen, the species will be identified, the number of individuals recorded, the distance along the transect line, the GPS location of the animals (calculated from the GPS location of the vehicle and the distance and direction of the animals to the vehicle), and the habitat type will be recorded in addition to the perpendicular distance of the animal from the observer when first encountered. The large mammal species commonly encountered during surveys include eland, impala, kudu, rhino, elephant, springbuck, waterbuck, wildebeest and zebra. GPS and habitat data can be combined to create GIS maps of the reserve and used to investigate ranging and habitat use of specific species. Distance sampling may be used to create population estimates of specific species.

In order to quantify large mammal use of vegetation in the reserve, we will be recording dung as an indicator of visitation at the same sites used for our vegetation surveys. 10 m x 10m plots are set up in each of the three main vegetation types in the reserve: 1) True Fynbos ; 2) Renosterveld; and 3) Old fields or Pastureland. Within all plots, large herbivore (larger than a hare) mammal dung is identified and collected. All dung piles (or pellet groups) are noted and

identified. A pellet group constituted of at least 5 pellets of similar size, shape, texture, and colour (Radloff, 2008). There are also be camera traps at each site to estimate animal visitation and grazing impact.

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 Gondwana 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 the long-term data sets that belong to the reserve and may use them for their research projects.

## Recommended Reading

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- Staver, A Carla, Corli Wigley-Coetsee, and Judith Botha (2019), 'Grazer movements exacerbate grass declines during drought in an African savanna', *J. Ecol.*, 107 (3), 1482-91.
- Teren, Gabriella, Norman Owen-Smith, and Barend F N Erasmus (2018), 'Elephant-mediated compositional changes in riparian canopy trees over more than two decades in northern Botswana', *J. Veg. Sci.*, 29 (4), 585-95.
- van Coller, Helga and Frances Siebert (2019), 'The impact of herbivore exclusion on forb diversity: Comparing species and functional responses during a drought', *Afr. J. Ecol.*,m 00:1-15.