

Project Proposal:
*Spatial Ecology of a Baboon Troop in South
Africa*

Dr. M. J. O’Riain

Head, Baboon Research Unit

University of Cape Town

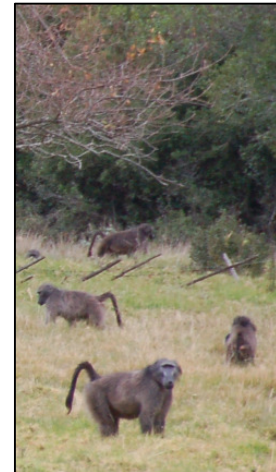
Summary

This is a proposal to fund equipment for a study of a unique troop of baboons that has been observed on a private nature reserve, Wildcliff, in the Langeberg mountain range of the Western Cape. The study will be conducted by a volunteer field researcher under the supervision of Dr. Justin O’Riain, Director of the Baboon Research Unit at UCT. The estimated cost for the 2 year study is R24 888.

Rationale

This is a proposal to support a study of a unique troop of Chacma baboons (*Papio hamadryas ursinus*) that has been observed on a private nature reserve, Wildcliff, in the Langeberg mountain range of the Western Cape. Baboons are among the most behaviourally flexible, adaptable, and intelligent mammals. Habitat alteration within the Wildcliff reserve and neighbouring areas in the form of clearing alien vegetation and the controlled burning of senescent vegetation is scheduled to take place over the next decade. These landscape changes will have both direct and indirect effects on the availability and suitability of habitat for the local baboon population. Understanding how these land-use practices impact on the behavioural and spatial ecology of baboons can only be achieved if we are in possession of adequate baseline data with which to make subsequent comparisons. The principal objective of this proposal is thus to provide such data to empower managers with the necessary information to effectively conserve this component of the South African mountain fynbos biome. Baboons serve a central role in fynbos biodiversity, spreading seeds of proteas and other plants and providing food for endangered leopards.

The aim of this project is to provide this baseline empirical spatial data by conducting extensive investigations of the area use patterns of the resident baboon troop. Data analyses will highlight baboon preferences for particular habitats within Wildcliff, in terms of area, altitude, broad and fine scale vegetation cover, proximity to water sources and agricultural land. Together these results will provide information on the relationships between home range size and habitat type. Project outputs will include the generation of detailed GIS maps of baboon area use, foraging-effort distributions and seasonal movement patterns.



To achieve this stated objective GPS tracking collars will be fitted onto one female baboon within the troop for a period of 12 months. The collar will record global positioning systems (GPS) data points at predetermined intervals throughout the day. GPS data will be analysed using geographical information systems (GIS) and the home range of the troop will be calculated using the quadrature method. Area residency of the troop within those described home ranges will be determined by calculating the frequency of GPS datapoints within each quadrature. Broad-scale attributes of each quadrature (e.g., habitat type, proximity to water sources and altitude) will be determined using GIS layers. Fine-scale attributes of each quadrature (e.g., community composition, community structure, age of vegetation, burning and land use history) will be determined with the assistance of a botanical specialist and through analyses of GIS layers and historical records. Partial correlations will be used to derive a measure of the relative importance of these broad and fine scale quadrature attributes in determining troop area residency and movement patterns.

In addition to GPS data, research assistants will follow the troop on foot during Winter and Summer and collect detailed behavioural data (e.g. foraging) to provide fine scale measures of habitat use within the home range. Seasonal differences in home range dimensions, area residency and ranging patterns will be investigated. This study will provide the first detailed information on the spatial ecology of a baboon troop within the Langeberg mountain area and will provide important data for comparative studies with other troops currently being studied in the Western Cape.

GPS collars have been identified as the most practical and least invasive means of collecting general year-round habitat use data. Furthermore, once this project is complete the collar batteries can be replenished and further monitoring of the troop can take place. Alternatively the collars can be refurbished for use on other study systems. The collars are supplied by a Pretoria company, Africa Wildlife Tracking, with extensive experience in wildlife monitoring (www.awt.co.za).

About the Reserve

Wildcliff is a Nature Reserve near Heidelberg in the Western Cape. It is owned by the Wild Cape Nature Trust and is held in perpetuity for purposes of conservation and research. The reserve consists of 955 hectares, deep kloofs with afro-montane forest, rocky mountaintops and high meadows of fynbos. It borders on the Boosmansbos Wilderness Area, a UNESCO World Heritage Site. A more extensive description of the reserve, with directions, is provided at www.wildcliff.org.

Wildcliff has a program of hosting resident volunteer researchers who conduct long term studies of the fynbos vegetation and fauna, including primates, avifauna, and reptiles.

About the UCT Baboon Research Unit

The UCT Baboon Research Unit at the University of Cape Town is a collection of scientists focusing their research on baboons of the Cape Peninsula and other areas of the Western Cape. This research encompasses various aspects of baboon biology, including **ecology**, **behaviour**, **genetics** and **evolution**. Much of this research focuses on comparing the Cape Peninsula population to other baboon populations and studying the relationship between the baboons and their human neighbours. Current research topics include ranging patterns, habitat use, effect of human habitation on baboon behaviour and ecology, parasite transmission between baboons and humans, population genetics, and male and female reproductive strategies. Information about the unit's staff and projects may be found at www.baboonsonline.com/bru.

Part of BRU's goal as a research group is to contribute information on baboon biology that will aid in baboon conservation and management.

Benefits to a Sponsor

Funding the tracking equipment for this study will demonstrate the Sponsor's commitment to wildlife protection and understanding in South Africa. The reports and publications stemming from the study will acknowledge the Sponsor's financial assistance, and the Sponsor may refer to this contribution in press releases and marketing. The Sponsor will also be able to visually track the baboon troop's movements via the internet, using Google Earth.



Project Objectives

1. Describe and quantify the home range, movement patterns, habitat preferences and area residency of the Wildcliff troop.
2. Conduct a fine-scale spatial and temporal analysis of the habitat and food preferences of the troop, to describe and explain their area use patterns.
3. Investigate relationships between the agricultural environment and troop movement patterns, looking specifically at determining which agricultural features are most attractive to baboons.
4. Collect data that can be used to generate a predictive model of the spatial and temporal responses of the troops to the imminent habitat changes.
5. Develop the institutional capacity of Cape Nature to manage and conserve baboons on the long-term by:
 - a. providing them with accessible and usable GIS maps
 - b. providing them with detailed descriptions of baboon habitat preferences
 - c. training rangers to continue with long-term spatial data collection once this project is complete
6. Contribute towards the long-term monitoring efforts of baboons in the Western Cape initiated by BRU, UCT.
7. Communicate research findings at Fynbos Forum 2008 and 2009
8. Communicate research findings at Zoological Society of South Africa 2008 and 2009
9. Take part in a synthesis workshop about baboon management issues.
10. Identify schools most likely to be impacted by the presence of baboon in the area and visit one school per month to run education sessions.
11. Increase public awareness and understanding of baboon spatial requirements and population structure by posting information boards in areas with high levels of human/baboon interaction.

Project outputs

1. GIS-based baboon land use map depicting the troops' home range (by June 2009).
2. GIS-based maps of seasonal troop movement patterns (by June 2009).
3. Spatially explicit dataset that can be used to forecast troop responses to habitat change, and with which post-project monitoring data can be compared (by June 2009)
4. Provide regional land development recommendations to Cape Nature based on assessments of baboon requirements for area and habitat type (June 2009).
5. Presentation at Fynbos Forum (2008 and 2009)
6. Presentation at Zoological Society of South Africa (2008 and 2009)
7. Workshop output: Publication on relevant baboon issues as part of the WWF South Africa Report Series.
8. Publish project results in accredited scientific journals.
9. Disseminate findings through popular media.

This intensive data collection phase would run for a full year commencing once a GPS collar has been deployed on the troop.

Methods

a) *Animal handling methods*

Only adult females that are neither pregnant nor lactating will be used in this study. Females are utilised as they remain with their natal troop for the duration of their lifetime thus providing more reliable records of troop movement than males, who typically disperse in adulthood. Adults are preferred to either sub-adults or juveniles as they are larger and thus less likely to be adversely affected by the extra weight of a GPS collar.

b) *Immobilization*

i. Drugs and dosages, and method of administration used for immobilization

- Ketamine 2mg/kg
- Medetomidine 0.02 mg/kg
- Drugs to be administered by a veterinarian via a low impact 1.5ml plastic dart with a pressurizing chamber – Daninject or Telinject.

ii. Detail of the care of the animal during immobilization.

- Immobilised females will be temporarily removed from their troops to a covered field station, and fitted with GPS collars.
- They will then be placed in a holding cage to recover from the effects of the anaesthesia. Only when fully recovered will the female be released back into her troop.
- Each collared female will be monitored throughout the project to ensure that the collar is having no detrimental effects on her health. At the end of the study period this process will be repeated to remove the collars from the females.
- All procedures will be performed by qualified veterinarians with experience in large mammal immobilisation and capture.

iii. Procedure to be carried out during immobilization

- Once immobilized the animal will be weighed and measured before fitting the GPS collar around the neck. A 5ml blood sample will be taken for genetic analyses and a stool sample as part of a long-term parasite project run by BRU.
- Experienced veterinarians will accompany the female baboon until she is successfully released back into her troop.
- Permit from Cape Nature to be obtained (see Appendix C).

c) *Deliverables*

- GIS-based baboon land use map depicting troop home ranges.
- GIS-based maps of seasonal troop movement patterns.
- GIS-based maps of the broad and fine scale habitat structure of the troops home range.

Project budget requested:

Provider	Item	Amount (R)		
		Year 1 Jan 08–Dec 08	Year 2 Jan 09–Dec 09	Total 2 years
	Baseline spatial data for troop			
Africa Wildlife tracking	1 x GPS/GSM baboon collars @ R15,560.	R 15,560.00	-	-
Africa Wildlife tracking	Annual service fee for cellular collars @ R3,264 each	R 3,264.00	R 3,264.00	-
Dr H. Currie	Veterinarian	R 1,000.00	R 1,000.00	-
Dr H. Currie	Ketamine 2mg/kg; Medetomidine 0.02 mg/kg; Low impact 1.5ml plastic darts with a pressurizing chamber – Daninject or Telinject. @ R400 per baboon	R 400.00	R 400.00	-
	Total	R20,224.00	R4,664.00	R24,888.00

Compiled by Dr M.J. O’Riain and T.S. Hoffman on 6th September 2007 (Baboon Research Unit, University of Cape Town)

UCT Zoology Department.
 Email: justin.oriain@uct.ac.za
 Phone: (021) 650-3645