A Survey of Vertebrates at Wildcliff Nature Reserve

Research Proposal

by

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Introduction

Wildcliff Nature Reserve is located in the Western Cape Province of South Africa. The dominant vegetation biomes are the fynbos and afromontane forests, both of which support a rich variety of animals adapted to these environments (ref). As a newly established reserve, it is important to determine the fauna that inhabit the area. By identifying the wildlife we can gain a more comprehensive knowledge of the reserve and develop educated and effective management plans to preserve threatened species. Having this information also introduces the possibility of determining the impact of invasive/alien plant species on the local wildlife.

This set of surveys will seek to establish a baseline data set on the vertebrates of Wildcliff. More details subsequent studies will provide supplemental data on the vertebrates, as well as on other living creatures. The study will cover three principal taxa:

- Mammals
- Birds
- Reptiles and amphibians

Methods

The methods used will be techniques commonly employed in terrestrial surveys or vertebrates. In order to maximize the number of species identified, a comprehensive range of methods will be used.

1. Mammals

1.1 General observation

Fixed areas will be walked in the early morning and late evening, when activity is highest for many animals (ref). Representative habitat types will be focused on when standardized transect studies are not being conducted. Binoculars will be used when necessary.

1.2 Live capture/release trapping

Elliot traps or other wire cage traps are often used to capture both small and large mammals. By studying the behavior and habitat of targeted species, traps can be placed in predicted areas of high traffic. ___ traps will be strategically placed throughout the reserve. Traps will be baited in the evenings and checked every morning and evening.

1.3 Scat analysis

Fecal material will be identified using Smithers' Field Guide. After identification, scat will be marked in some way that indicates that it has already been found to prevent recording it twice. A GPS unit will be employed to identify the location of scat (and tracks) and the fecal material will be collected for later analysis.

1.4 Tracks

Prints will be identified using Smithers' Field Guide.

1.5 Hair funnels

Hair funnels are designed to capture a sample of mammalian hair on a sticky card. The funnels are baited and placed on the ground, rocks, or other areas that provide habitat for targeted animals. Hair funnels are advantageous in that they allow the animal to come and go without actually trapping it, but they may not be practical for this study due to financial limitations and lack of investigator experience in mammalian hair identification.

1.6 Spotlighting

A high-powered spotlight will be used between dusk and 2200 hours (Apendix 1). The spotlight search will be looking for species in trees and on the ground. If possible, spotlighting will take place from a slow moving vehicle. It is important to conduct searches at night to identify nocturnal animals such as bats and certain birds/mammals that would not be found during the daily searches.

1.7 Evidence of species-specific behaviors.

Field signs will indicate the presence of certain mammals. For example, small mammals leave distinctive signs in the form of feeding remains (App. 13.3?). Mature trees can be examined for hair, cracks, and crevices that indicate the presence of bats (Ref).

2. Birds

2.1 Sighting with binoculars

Diurnal birds will be sampled using broad observational surveys. Surveys will take place at specific, regular times at dawn and dusk to coincide with bird activity (REF).

2.2. Sound

Call playbacks will be used, where possible, to elicit responses from nocturnal birds such as owls. Call playback, done sporadically, is a technique commonly used to identify birds. Debus (1995) outlined the methodology for call playback of nocturnal species. "This involves the broadcast of recorded calls of selected species for a standard period of

time, followed by a period of time spent listening for calls of nocturnal birds and spotlighting in the immediate area" (URS APP. 1.1)

2.3 Evidence of breeding

Any evidence of breeding will be noted. Signs of breeding include the presence of juveniles and food being carried by parent birds (App. 13.3).

3. Reptiles

3.1 General search and observation

3.2 Pitfall trapping

Pitfall trapping is a technique that is widely used in community surveys. Simply put, they are holes in the ground (usually made of a glass, plastic or metal container) into which animals fall and cannot escape. This trapping technique is important in wildlife sampling because it is inexpensive and allows for capture of species that are difficult to obtain by other methods. Pitfall traps have been criticized by animal ethics committees because they deprive the trapped animals of food and water and they do not prevent trapped animals from killing each other (animal ethics infolink). The following modifications should be made to ensure the safety of the animals; PVC tubing to provide shelter inside the trap, shade covers to reduce hot temperatures, rain guards should be fitted to prevent drowning, and traps may have "exclusion barriers" to prevent unwanted predators (animal ethics, infolink).

Several pitfall traps will be placed in areas that are ideal reptile habitats and left overnight. To be effective they should be placed along known 'runs', where they are most likely to be encountered by the animals to be trapped." (Cogger, H. "The Reptiles and Amphibians of Australia" 1986 page 24). The traps will be checked every morning and late afternoon and the animals captured will be released after identification. A drift fence is essentially a wall that a reptile cannot climb over, and drift fences are often placed in front of a pitfall so that as the animal tries to find a way around the fence it is forced into the pitfall.

Statistical Analysis

Traditional surveys simply look for the presence/absence of species and record the number of animals observed. I propose using formal model-based approaches that allow for estimation of species density and projection of entire population numbers at Wildlcliff. By determining the abundance of animals we will have a more comprehensive understanding of the community dynamics. Furthermore, we can gain an understanding of the spatial distribution (REF?) of the species under investigation.

Mark/Recapture (Capture/Recapture)

The simplest capture-recapture model (sometimes called the two sample model) is used solely to estimate the size of a population. By using the number of animals captured and the number of animals recaptured, it is possible to predict the number of animals not caught in either sample and estimate the population size. In order for the estimate to be accurate, there are several assumptions that must hold true. The following is an excerpt from a scientific paper that used mark-recapture methods and gives examples of the assumptions and their practical applications:

Mark-recapture methods assume individuals can be identified to determine whether they have been 'captured' and 'recaptured'. Because individual jaguars are easily identified by variation in their rosettes (Plate 1), photographs from camera traps facilitate this analytical technique (Wallace *et al.*, in press). Another assumption of the method is that of demographic closure of the sample population. The model assumes no births, deaths or migration during the sample period. Karanth & Nichols (1998, 2000) used 3-month sample periods to ensure demographic closure for tigers. Our studies took place over *c*. 2 months. The final major assumption of the model is that no jaguars within the sampled area have a zero probability of being captured. The smallest conservatively estimated home range size for jaguar is 10 km^2 for a female jaguar in a Central American tropical forest habitat (Rabinowitz & Nottingham, 1986). With no data from the dry forest Chaco sites in Bolivia, we assumed home ranges in the Chaco to be roughly twice as large (20 km^2) for a female jaguar. Consequently, we placed cameras such that no areas without cameras greater than 10 km^2 (rainforest in Belize and Bolivia) or 20 km^2 (dry Chaco forest in Bolivia) existed within the sample area. *Source: Oryx Vol **38** No 2 April 2004*

"The use of camera traps for estimating jaguar *Panthera onca* abundance and density using capture/recapture analysis" Chao A. Estimating Population size for sparse data in capture-recapture experiments. Biometrics 1989; 45: 427-438

Transect studies
Road strip census method
Timed area searches for birds

Schedule of Experiments

General observations/ walking searches
Elliot tapping
Pitfall trapping
Night searches (spotlighting)
Playback (bird calls) ?
Invertebrate searches/ nets

Equipment

Binoculars
Traps (Elliot/Pitfall)
Spotlight (500 Watt)
Nets
Camera
GPS?
Bird call recordings?

Bibliography

http://www.animalethics.org.au/reader/wildlife-research/arrp-pitfall-traps.htm

http://www.jwildlifedis.org/cgi/reprint/6/4/356.pdf