Welgevonden Leopard Research

Progress Report 9 :

Preliminary research utilising GPS clusters to locate leopard feeding sites

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Introduction

Project Overview

Beginning in August 2010 I will be investigating the feasibility of using GPS data from tracking collars to identify potential feeding sites made by leopards *Panthera pardus*. My work will be carried on Welgevonden Private Game Reserve, and will at present include the use of three collared leopards. Data from their GPS collars are recorded every 2 hours and will be projected onto a GIS software package (arcGIS 9.2), any cluster of points will be investigated in the field. A cluster of GPS points will be characterised by a movement distance no greater than 50m. Habitat information and axillary data will also be recorded at each site (both at feeding sites and non-feeding sites).

On completion, I hypothesize that upon a certain GPS point threshold kills and feeding sites can be expected to be found. This information can assist other researchers, studying in similar environments, in effectively and efficiently monitoring leopard movements with regard to feeding dynamics. This baseline study may help researchers choose which schedule to set their own GPS collars to, in order to maximize their own research outcomes. By collecting habitat and vegetative data I will be able to analyse whether there are any significant patterns in feeding behaviour. Prey species will also be investigated, which will assist Welgevonden Private Game Reserve in monitoring their reserve's stocking levels.

This research will be carried out until June 2011.

Pilot Studies

The majority of August 2010 was used as a pilot study period. I needed to investigate many aspects of my research to ascertain whether my methodology were correct. Some aspects were altered and others were changed completely.

Taken on the 7th of September 2010 of a adult male Impala after it had been consumed by one of our collared female leopards (TSH-2713). The kill was a week old. The female and her two cubs fed on the impala for 28 hours.

Methods

GPS Collar Data

GPS positions are recored every 2 hours and stored on the Tellus Collar onboard memory. Once 7 locations have been stored the collar initiates the upload sequence which uses a GSM cellular network. These data packages are then emailed directly to me. I project the data onto arcGIS ver.9.2 and search for clusters. Once the clusters are located, I go out into the field to investigate them.

In the Field

I navigate to each cluster using a GPS device. Once I have arrived at the site I search for any evidence of feeding, this may be in the form of plucked fur, blood, bones, flattened grass, skull or jaw bones etc. If a kill is found I will collect samples to be used to identify the species. The location of the feeding site is very important too, quite often a feeding site will be found at the base of a tree or in the tree. Therefore habitat data are collected at every site, a 400m^2 quadrat is laid out over the site, the quadrat is divided into four smaller quadrats (refer to figure 1), the following are collected:

- Tree species, height, diameter, base volume, height of canopy (of tree where kill was found)
- Kill zone, area first eaten
- Photographs of the kill, the tree and the site
- Elevation
- A broad-scale structural classification of vegetation (adopted by Edwards 1983)
- Grass percentage cover, average grass height
- Shrub percentage cover, average shrub height
- Rock percentage cover, average rock height, class of rock
- Tree percentage cover
- Slope
- Percentage visibility
- Primary and secondary dominant tree species
- Number of refuge trees
- Drags marks, den sites, water sites
- Presence of scat (both leopard and other animals)
- Prey samples

GPS collars by Followit™ , a Swedish company.

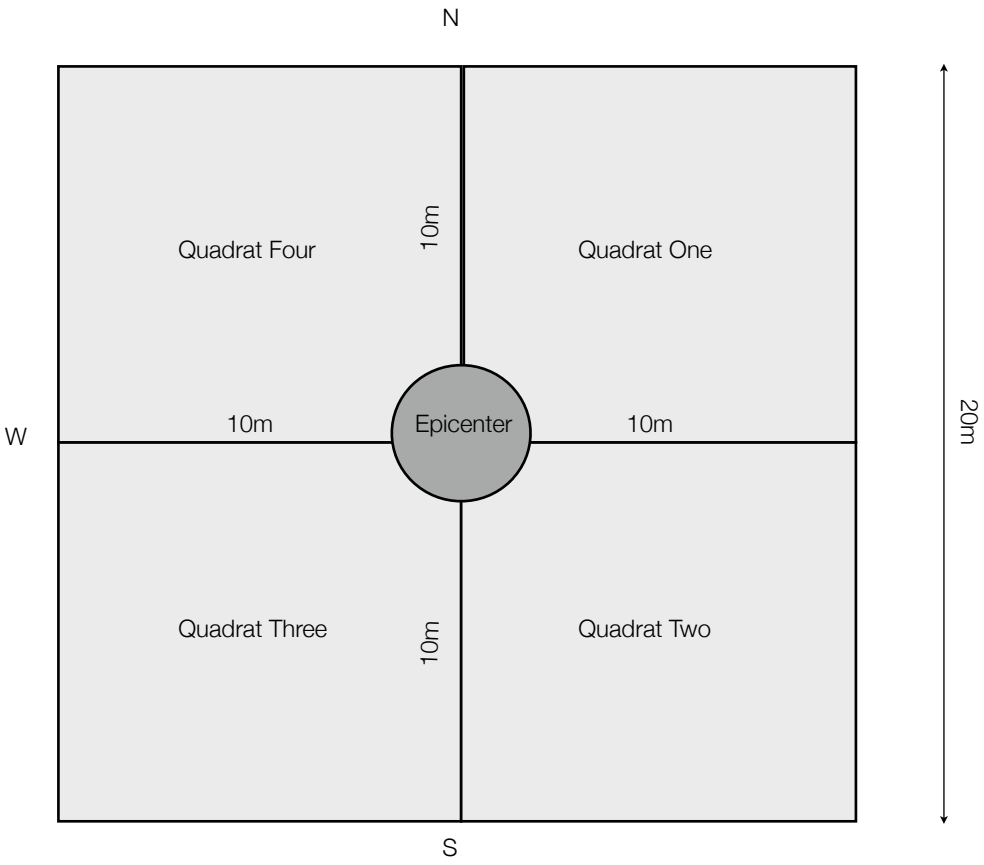


Figure 1. Diagram showing how the cluster site is divided.

If a feeding site is found the quadrat epicenter will fall on that central point, if no feeding site is found the quadrat epicenter will fall on a randomly assigned GPS point within the cluster.

Feeding site of another female collared leopard (TSH-2714). Rope is laid according to wind directions, with the epicenter located at the center of the feeding site.

Axillary Data

Collection of finer scale habitat data are also gathered at feeding sites and non-feeding sites. It would be beneficial for us, other researchers and Welgevonden management to better understand the feeding behaviour of leopards within Welgevonden Private Game Reserve. By sub-sampling the surrounding habitat we can compare that to the actual feeding site. Five 25m^2 quadrats are used to sample the habitat, one quadrat is laid over the actual feeding site (or random cluster point in the case of a non-feeding site) and the remaining four quadrats are randomly laid over the surrounding habitat (refer to figure 2):

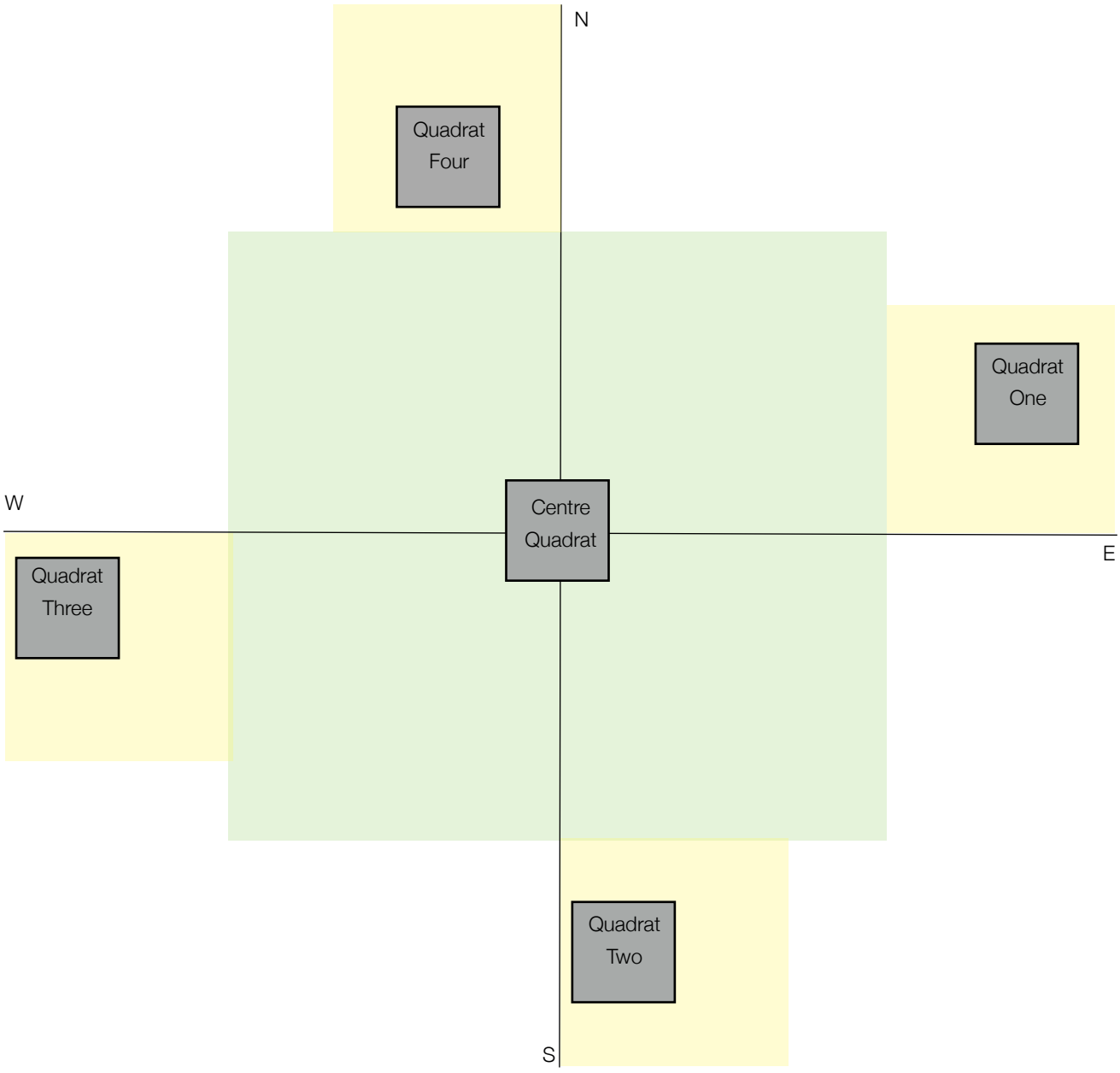


Figure 2. Diagram showing how the surrounding habitat is sub-sampled. The dark grey squares represent 25m^2 quadrats, these are the areas where data are collected. The large green square is the buffer zone measuring 800m^2 where sampling cannot take place. The yellow squares (100m^2) represent the available area for sampling, the grey quadrats are randomly placed within these areas.

The following data are collected from each 25m^2 quadrat:

- Grass percentage cover, average grass height
- Shrub percentage cover, average shrub height
- Number of shrub species
- Tree stem density
- Percentage rock cover, average rock height
- Individual trees (species, height, diameter, base volume, height of canopy)
- Percentage visibility

Above: Same kill as before, this photo provides evidence that the kill was either cached or consumed up in this Mountain Seringa *Kirkia wilmsii,* 4m above the ground.

Below: The feeding site of leopard TSH-2713. She had killed a klipspringer and fed on it with her cubs for 12 hours.

Leopard Capture

Refer to Progress Report 8 (www.welgevonden.org) for a detailed explanation on the trapping technique. We conducted the research under University of Pretoria Animal Use and Care Committee ethics clearance protocol A022-06 with all its amendments and Limpopo provincial government leopard permit capture number CPM-004-00006.

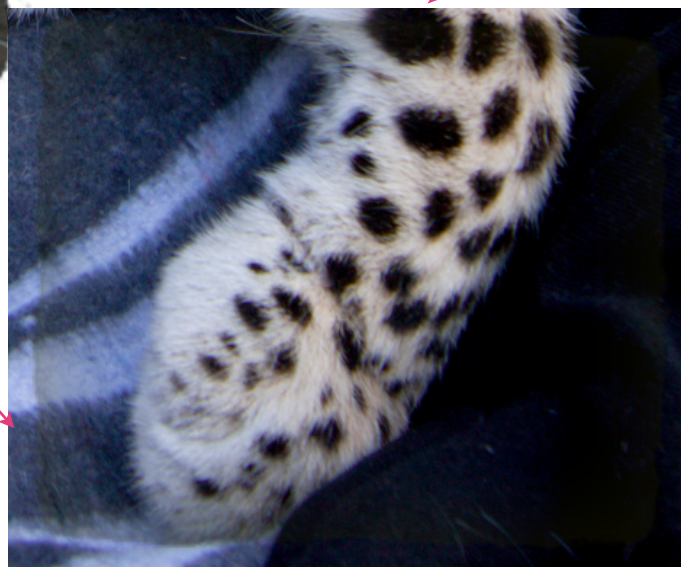
August 2010 - Present

We began leopard trapping at the end of August. To gather better data for this research we require more leopards, the minimum being six collared leopards. When we started trapping we initially wanted to capture another two males and one more female, making it three males and three females. On the 29th August we managed to capture a subadult female leopard along the Taaibos Valley Road, eight days later we found that our only collared male leopard (TSH-2710) had removed his collar. That then left us with only three collared female leopards. So we now require three male leopards.

Our method of capturing these leopards involves using a spring loaded loop system and a stepping plate. The leopards are guided through a vegetative corridor towards bait that is hung in a tree, the primed stepping plate is activated once the leopard places a small amount of pressure on the disc. The thrower flings back, looping the cable around the leopards leg. The loop is fixed to the ground using a staked anchor. The entire system is spring loaded so to prevent injury, as the leopard pulls on the device the springs compress counteracting the pulling force of the cat. The traps are maintained on a daily basis, primed in the evenings and checked every morning at 5am. There are eight traps running along our trap line within the Eastern region of the reserve.

Setting a new trap along the Sterkstroom River. We try look for areas near a road and a drainage line, these areas tend to be sites where animals (especially leopards) funnel through. Notice the vegetative corridor constructed out of large and small brush. The bait is hung high to prevent hyena's from becoming too interested.

Left: The captured Taaibos female (TSH-2712) lying sedated on the back of the bakkie. We were about to fit her new GPS collar and take all the necessary morphological measurements.



Right: The enlarged shot of the paw that was in the loop. No damage to any bones or tissue, only minor hair loss and some swelling.

Leopard TSH-2712 rapidly leaving the recovery box after the drug (Zoletil™) had worn off. Her movement was excellent and she showed no signs of injury. We are now tracking her on a daily basis. She has already made some interesting kills.

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References

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