CAPE CRYPTIC CARNIVORE

.. revealing the hidden gems of the Little Karoo ..

CONTENTS

STUDY SITE

The Little Karoo is a mountainous semi-desert located at the southern tip of the African continent, where Fynbos and Succulent Karoo vegetation is found. The land is sparsely populated and the landscape is a mosaic of farms and small protected areas, which makes for an extensive grazing area with a substantial wild mammal presence.

The Litle Karoo is part of a unique biogeographic region, as it is one of the 34 internationally recognized biodiversity hotspots.

The area cannot support large herds of herbivores since the nutrient-poor soils on which the vegetation grows do not provide enough nitrogen for the protein requirements of large herds.

Otchards at the feet of the Langeberg mountains.
In the valleys, near the major river beds, water is pumped to irrigate the soils and to produce fruits: apricots, peaches, nartjes, grapes and plums.

Large carnivores are therefore wide-ranging, elusive, secretive and low-density species; which exacerbates the fact that protected areas often do not provide sufficient space to allow these species to maintain viable populations.

For the same reasons, the agricultural productivity is very low and extensive livestock husbandry has remained for a long time the main economic activity. The farms were then considerably vast to host a high number of sheep and to remain economically viable.

But the region experiences a regression of the agricultural economy because of substantial actual and perceived economic losses due to livestock depredation.

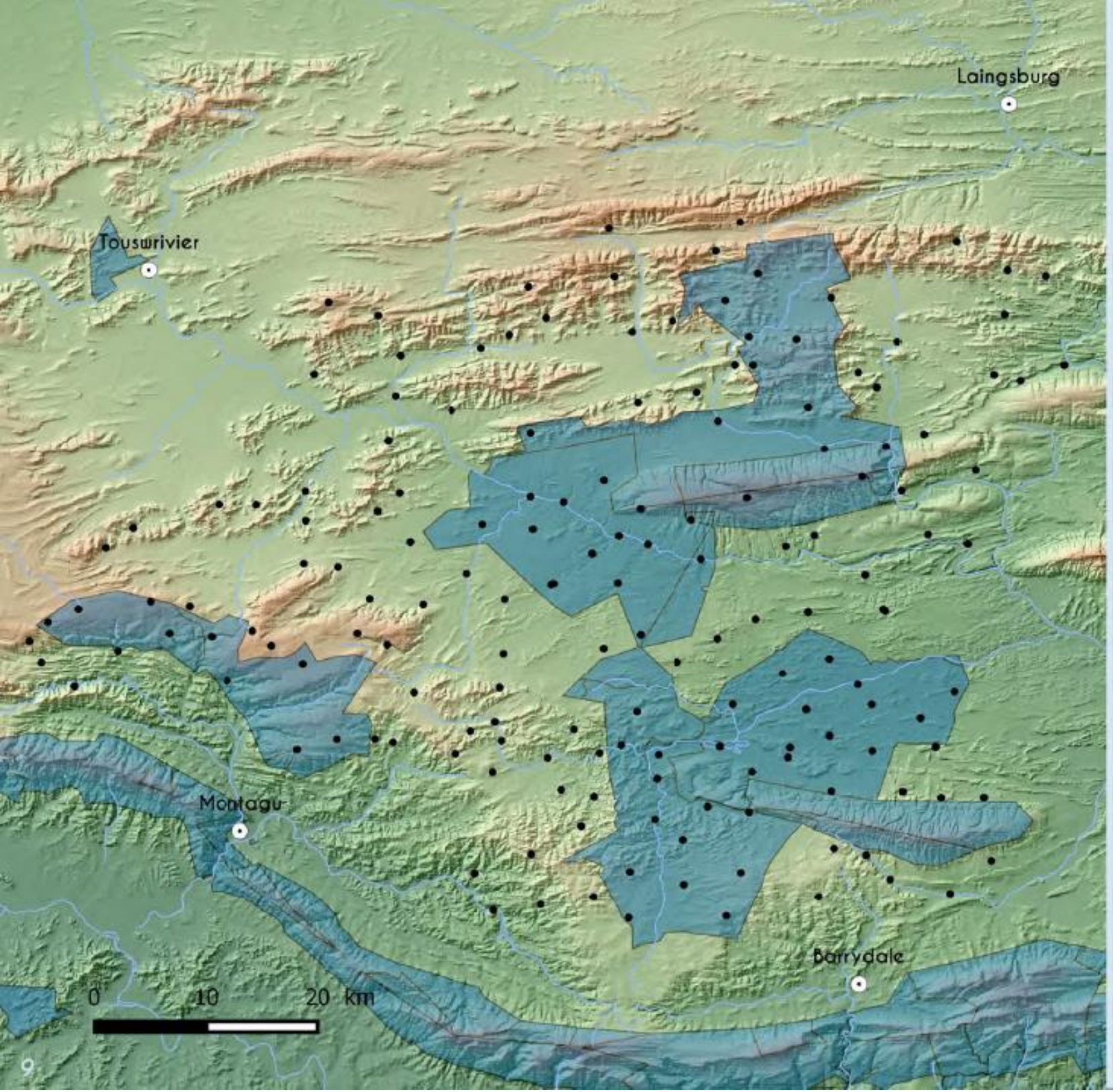
Long time ago, nearly everywhere in the Western Cape Province, one could find a plethora of mega-fauna, including buffaloes, black rhinoceros and even lions. Unfortunately the settlers decided it would be otherwise and these creatures have all been extirpated.

Mountainous road after the rain. In 2015, the Litle Karoo received good rains and the flowering season was spectacular. **Blooming wild flowers on top of the hills.**

It is a 500km long belt of rough mountains, stretching across the whole Province, that provided shelter for a wonderful array of smaller wild animals.

Here, in this pristine environment, one can get a glimpse of an African wild cat, find the quills of a porcupine, follow the tracks of a honey badger, observe a baboon troop on a cliff, hear the hooves of zebras running up the rocky slopes, or stumble in an aardvark's burrow.

In this part of the world, nature is discreet, and it is at night that the Little Karoo comes alive.



CAMERA TRAPPING

Given the vastness of the area (5000 km²), camera trapping is being undertaken as a series of regional surveys, each lasting three months. Thirty camera trap stations are deployed in a grid layout, along trails that channel animal movement. Every station is a pair of camera traps, facing one another, in order to photograph both flanks of the animals, which is necessary to identify individuals acording to their unique fur pattern.

The first deployment was undertaken in November 2013, in the northernmost section of the study site.

Legend

- Towns
- Camera trap stations
- Protected areas

Altitude (m)

- 0 - 195
- 196 - 542
- 543 - 891
- 892 - 1240
- 1241 - 1589

The first survey (November 2013 - January 2014) was aborted because of the January 2014 flood, the largest in the area in the last 35 years. 20 of the 60 cameras were destroyed by the water. Camera trapping started again in March 2014, after the cameras were replaced by cameras loaned from the Cape Leopard Trust.

The camera trap study was completed in August 2015 and the last batch of photographs is still being processed.

So far, more than 10 thousands photographs of 89 different wild species were collected. The carnivores that were photographed the most are:

- black-backed jackal *1155*
- African wildcat *491*
- caracal *410*
- gray mongoose *342*
- Cape mountain leopard *219*
- brown hyena *141*

A few camera trap photos, collected across the study site and showing aardwolves, caracal, baboons, leopard, brown hyena and aardvark.

The deployment design of the camera trap study was chosen so that we can apply Spatially Explicit Capture Recapture models to brown hyenas and Cape Mountain leopards. This will provide us with an accurate estimate of the population density, which is a crucial demographic parameter in conservation.

The black and white stripes on the brown hyena legs and the rosettes on the leopard body are like our finger prints, they are unique patterns that can be used to identify the individuals.

18 different brown hyenas and 29 different Cape mountain leopards were identified across the study site. Most of the leopards were males, suggesting that the deployment design was inadequate to photograph females. For these reasons we will estimate the density of male leopards in the population.

Old male leopard photographed in a kloof by a DSLR camera trap, August 2015. This is the only leopard photograph collected at mid-day; it was overcast and not too hot.

The camera trap data will also allow us to apply occupancy models and to look at space partitioning between sympatric predators.

It is believed that leopards and caracals compete for space. For these reasons, conservationists warn landowners against leopard persecution, which could prompt an increase in caracal numbers. In the Little Karoo, caracals pose a greater threat to livestock than Cape mountain leopards, according to landowners.

Brown hyenas are primarily known as scavengers, suggesting that leopards, caracals and jackals provide an important food source for the hyenas in the Karoo.

Using camera trap data to look at species distribution will give us an insight into these theories.

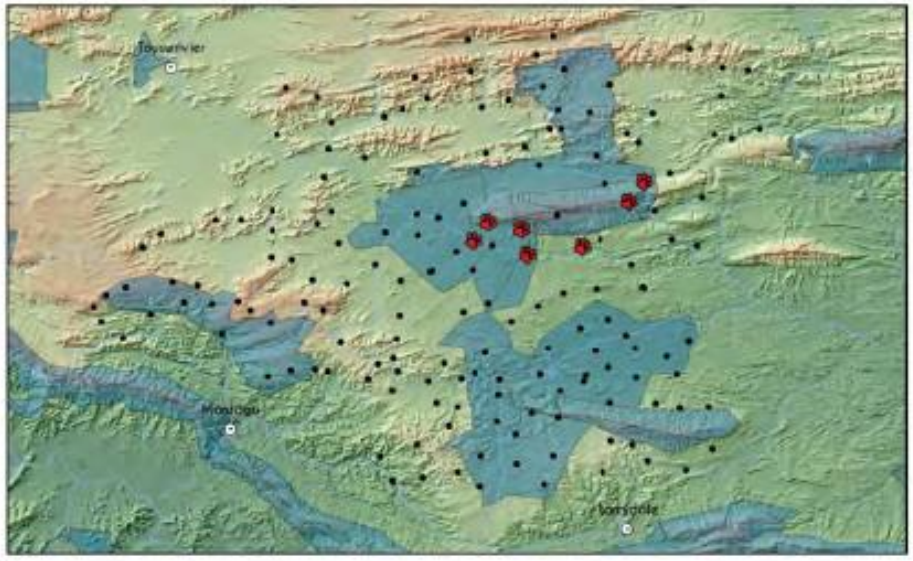
Another male leopard photographed in the same kloof near Montagu. This individual is younger. Both leopards were photographed on multiple occasions during the camera trap study.

LEO-7

Sex: Male
Capture events: 13
Capture locations: 7
Convex Envelope: 107 km²

List of capture events:

- ✓ 15-04-2014, 23h24
- ✓ 23-04-2014, 04h52
- ✓ 24-04-2014, 01h20
- ✓ 24-04-2014, 17h24
- ✓ 12-05-2014, 17h58
- ✓ 21-05-2014, 06h48
- ✓ 23-05-2014, 05h07
- ✓ 23-05-2014, 22h32
- ✓ 05-06-2014, 15h06
- ✓ 19-06-2014, 19h13
- ✓ 21-06-2014, 19h04
- ✓ 15-12-2014, 21h21
- ✓ 24-06-2015, 04h37



A page taken from the Cape mountain leopard catalogue of the Little Karoo. One of the 29 identified leopard moved over a 650 km² area.

The species catalogues for the brown hyena and the Cape mountain leopard of the Little Karoo are now nearly complete.

These documents are built as follow: every page is an individual profile. The two photos show the unique fur patterns on both flanks of the animal. The number of capture events and capture locations are also mentioned. The map shows the diferent camera trap stations and the capture locations for this individual.

The catalogue was made using the data collected during the camera trap survey. However, photos collected opportunistically by different landowners were added too.

The catalogues will be given to Cape Nature, the regulatory authority for biodiversity conservation in the Western Cape Province.

We are also in the process of producing an overview report of the camera trap survey. The aim is for the document to be used as a tool to learn about the study area and its wild inhabitants.

One important component of this document will be the species profile, which is a summary of all that we learnt from the camera trap survey about the species in question.

In the example given here, we can see the activity pattern of the species throughout the night, the cumulative number of capture locations as the survey takes place, some figures about the total number of photos, of capture events and of capture locations. Those figures are given for the whole study as well as for every survey. Finally, we can see the distribution map.

An example of species profile, in this case that of the caracal. It gives us the number of capture events and capture locations as well as the activity pattern throughout the day among **other things.**

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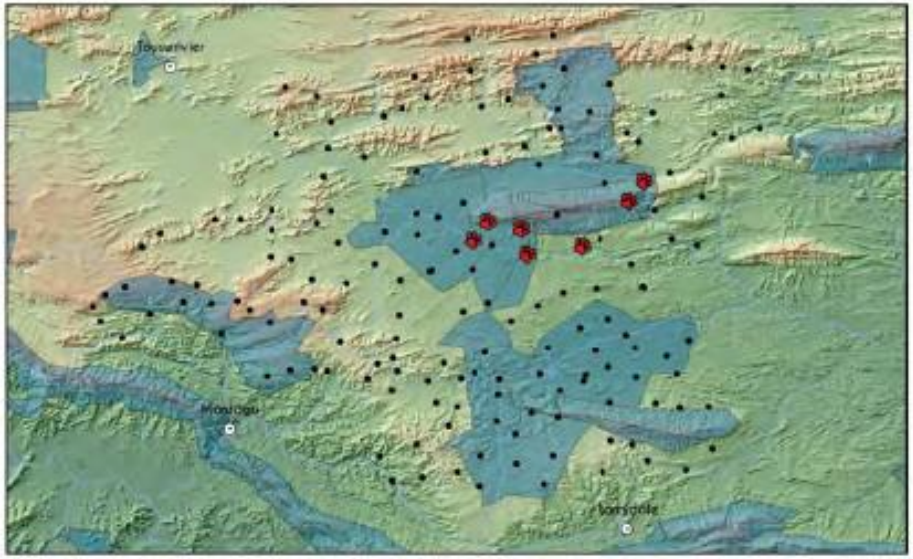

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ANIMAL TRAPPING

An important goal of the project is to capture and collar five brown hyenas in the Little Karoo, in order to fit them with satellite GPS collars, and study their movements.

The type of collar that we use allow us to dowload the movement data remotely, without having to track the animal. It would be very challenging to daily track these elusive animals, especially given the roughness of the terrain. It is also not possible to do any off-road driving, because it would damage the dry and fragile vegetation of the Little Karoo. GPS fixes are taken every 30 minutes and the data are sent to us every 12 hours.

A female brown hyena is fitted with a satellite GPS collar in the Little Karoo, South Africa. Being a young adult, it had very few scars and the teeth were in excellent condition.

Tracking shy and discreet animals like brown hyenas can also create disturbance and affect their movements, which is the reason why it was crucial, even though costly, to use satellite collars.

We use cage traps, setup as walk through traps (which means that the two doors on each side of the cage are open) in order to catch the brown hyenas. Several cages are deployed at specific sites across the study site, where we recorded signs of brown hyena activity. To lure the hyena inside the cage, we use the carcass of a wild animal. The carcass is placed outside the cage as one wants to avoid the animal to eat a lot before being anesthetised, otherwise it might regurgitate during the capture. We pack a lot of acacia branches around the cage and the bait to make sure that the carcass is not accessible except by going through the cage.

Brown hyena captures. The first photo shows missing and broken teeth, this hyena was quite old. Another image shows fleshy fingers, a crucial feature given the number of kilometers these animals cover every night.

Most brown hyenas behaved suspiciously when approaching the cages, even though we camouflaged the apparatus as much as one could. Most of them did not take the risk of walking in. We believe that these individuals have already experienced human persecution somehow. Those who got caught learnt to avoid our cages after release, which is why the chances for us to catch the same individuals again using cage traps are very low. The collars are therefore equipped with a drop-off mechanism, which can be activated once a low battery signal is received. It is also less disturbance for the animal, which is not anesthetised a second time.

So far, we have been particularly lucky with the fact that we did not catch any other species, expect for a black-backed jackal (*canis mesomelas*) once.

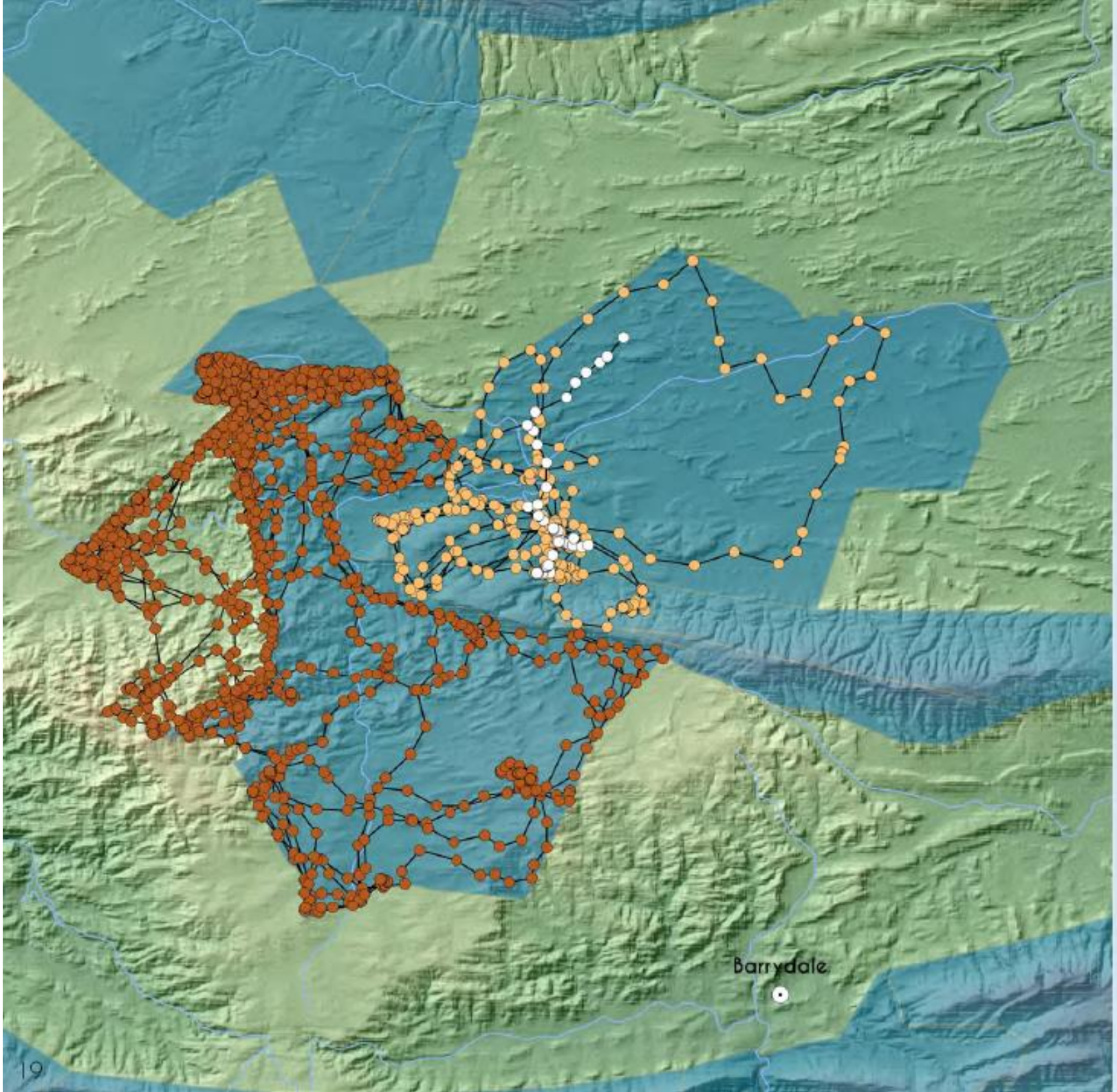
Old female brown hyena walking away after capture. This is the second brown hyena that was caught. It weighed 44kg and it was in good body condition.

Among the three collared brown hyenas, all were females. Two weighed 36 kg and appeared to be yound adults, whereas the third one was an old female weighing 44 kg.

The collars weigh 700g which constrains the size of the battery and therefore the battery life of the collars. With GPS fixes taken every thirty minutes, we can expect the life expectancy of the collar to be 8 months.

The data will tell us more about the brown hyena home range and habitat preference. We also plan to use these data in a computer simulation, which - hopefully - will allow us to test the performances of Spatialy Explicit Capture Recapture models for different camera trap deployment designs. We hope to then provide general guidelines about data collection protocols.

Beautiful young brown hyena waking up slowly after anesthesia. The drug composition that we use cause drowsiness. It is crucial to monitor the animal during the recovering time to make sure it is safe until it is alert again.



Brown hyena movement is conditioned by food source. It is therefore expected that brown hyenas walking longer distances evolve in an environment where food source is scarce.

The first hyena covered 1151 km (13.7 km per day on average).

The second hyena covered 321 km (15.4 km per day on average). .

The third hyena covered 113 km (16.8 km per day on average).

Results from data collected on the 05/12/2015

An example of activity profile. We established a profile for every collared individual.

Map showing the movements of the three collared brown hyenas. Brown hyena 1 was collared on the 13/09/2015, N°2 on the 15/11/2015 and N°3 on the 28/11/2015.

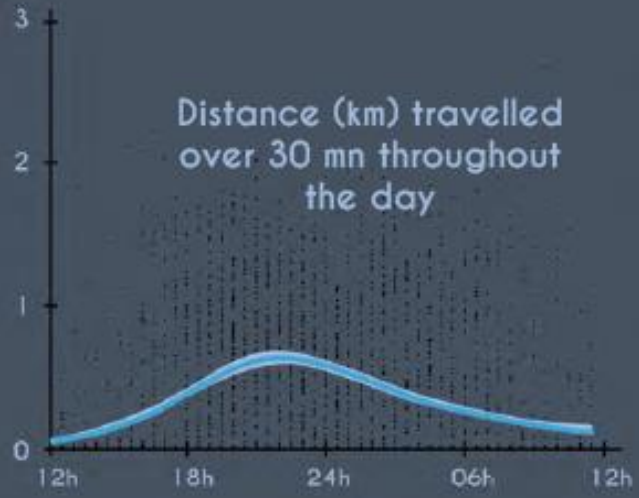
Legend

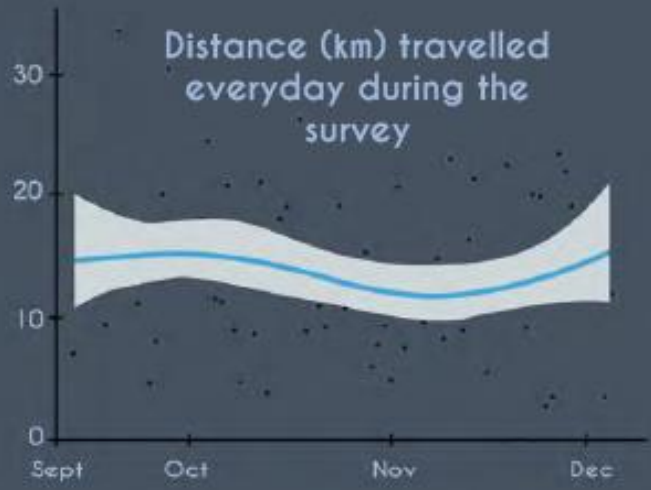
- Brown Hyena 1
- Brown Hyena 2
- Brown Hyena 3
- Town
- Protected Area

Altitude

- 0-194
- 195-542
- 543-891
- 892-1240
- 1241-1589

Brown Hyena KS1, *Collared 13/09/2015*





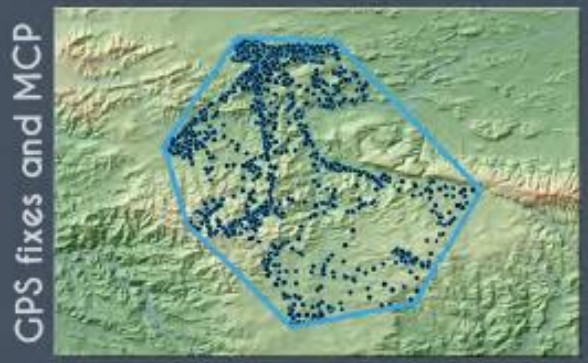
Tag ID: *60598810*
Number of tracking days: *83.5*

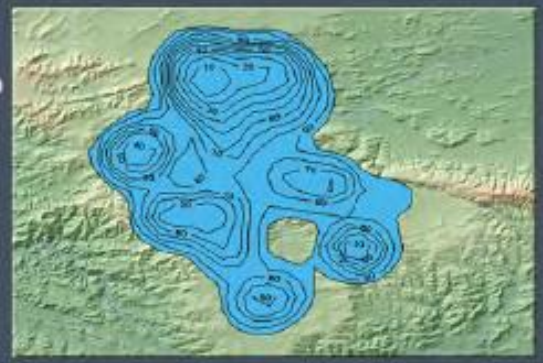
Total distance travelled: *1151 km*
Average dist. travelled per day: *13.7 km*
Maximum dist. travelled in a day: *33.5 km*

Peak time of activity: *22h07*

Minimum Convex Polygon (MCP): *399 km²*
Utilization Distribution (UD): *458 km²*

UD = Utilization Distribution (Home Range)
ID = Intensity Distribution (Residence)
RD = Recursion Distribution (Repetitive visits)





HYENA DIET

Brown hyenas are primarily known as scavengers. However, most of the diet studies conducted on brown hyenas, took place in areas where the density of carrion is high. Because brown hyenas are opportunistic, we can expect them to adapt their feeding habits to the environment. Therefore, it would be possible, when carcasses are scarce, for brown hyenas to hunt wild animals more regularly.

In other parts of the country, game rangers reported seeing brown hyenas preying on live steenboks for example.

Top: baboon and leopard skulls.

Center: a brown hyena carrying half of a dead baboon was photographed by a camera trap.

Bottom: we believe insects are an important component of the brown hyena diet.

It remains however very difficult to quantify the amount of prey killed and the amount scavenged on, especialy given the shy nature of the brown hyenas in the Little Karoo.

150 brown hyena scats were collected opportunisticaly accross the study site, where only jackals, caracals and leopards are a potential source of carrions.

25 brown hyenas scats were collected opportunistically accross the area where lions and cheetahs occur too. We hope to collect 125 more.

The scats are stored individually in paper enveloppes, to avoid the feces to rot, in case they still contain some moisture. They will then be washed and seemed so that only hairs and bones remain. When observed under a microscope, the hair structure allows us to identify the species. Thus, we can build up a list of prey items. It will not tell us whether the brown hyena killed the prey or not, but we can expect to see a difference between the scats collected where lions and cheetahs occur, and thoses collected where jackals, caracals and leopards occur only.

SPONSORS

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