



**RHODES UNIVERSITY**  
*Where leaders learn*



*Selati*  
GAME RESERVE



*Collared leopard female #3*

## **FIELDTRIP REPORT**

23<sup>rd</sup> May to 2<sup>nd</sup> August 2017

2<sup>nd</sup> DRY SEASON

Report by:

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## INTRODUCTION

My third field trip to Selati Game Reserve (Selati), was the second dry season sampling period and took place from the 23<sup>rd</sup> May to the 2<sup>nd</sup> August 2017. This fieldtrip was successful in terms of collaring large carnivores (lion, leopard and spotted hyaena), camera trapping and scat collection. Although a few kill sites were located, greater efforts need to be made to collect more, especially for leopards, during the upcoming fieldtrips. The next fieldtrip, which will be the final camera trap survey and road strip count will take place from 4<sup>th</sup> January to the beginning of March 2018.

## PRELIMINARY RESULTS and CONCLUSIONS

### Camera trap survey:

The second dry season camera trap survey ran over 60 nights for a total of 1780 trap nights, during which 3583 animal photographs were captured (Table 1.) From these photographs, 36 mammal species were identified of which 13 were carnivores (Table 1).

**Table 1:** Summary data from the second dry season camera trap survey conducted in Selati Game Reserve between 31<sup>st</sup> May and 2<sup>nd</sup> August 2017.

	n	%
No. trapping nights	1780	-
Total no.images captured	3583	-
Total prey events	1931	100
Small prey (<30kg)	351	18.18
Medium prey (30-90kg)	847	43.86
Large prey (>90kg)	487	25.22
Megaherbivores (>1000kg)	246	12.74
Total carnivore events	403	100
Small carnivore (<10kg)	31	7.69
Medium carnivore (10-20kg)	185	45.91
Large carnivore (>20kg)	187	46.40
Total mammal species	36	-
Total prey species	23	-
Total carnivore species	13	-

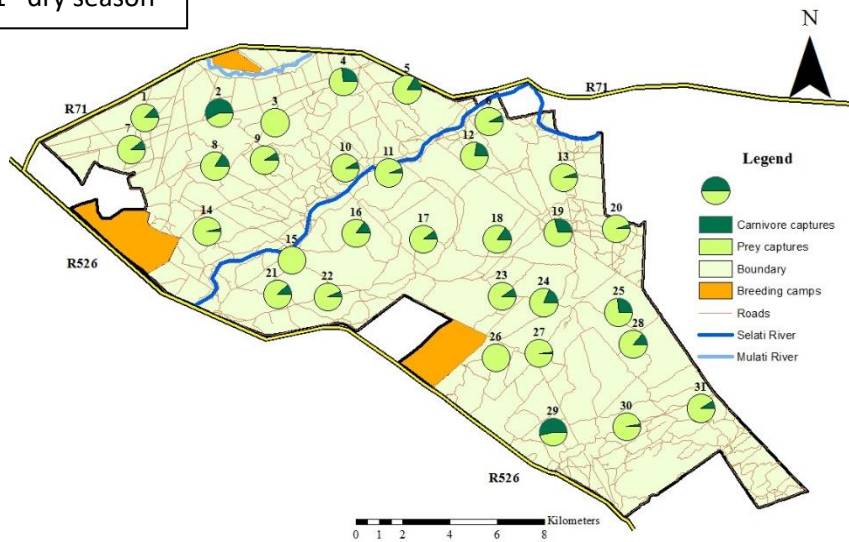
When comparing all three camera trap surveys to one another it is evident that the wet season survey captured the most number of animal photographs despite having the least number of trap nights (Table 2). Although, the second dry season survey had the highest number of both prey and carnivore capture events overall, the number of large prey events and megaherbivore events has decreased (Table 2). In fact, there is a decreasing trend in large and megaherbivore events across the three camera trap surveys. I suspect that this is due to the increase in hunting and or selling of these animals on Selati over this time period. With regards to medium prey events, the opposite trend was observed as the event numbers increase across the three camera trap surveys (Table 2) despite a large number of impala being culled for ecological reasons. It will therefore, be interesting to see how these observed trends play out during the last (wet) camera trap survey.

Although all three sampling surveys captured 36 mammal species, the ratio between prey and carnivore species differs each time (Table 2). During the second dry season survey, two new species were captured; dwarf mongoose and klipspringer. Both these species occupy very small home ranges, which our camera trap survey is not designed for and so therefore, it is not unusual that these species were only recorded during our third camera trap survey. Additionally, klipspringer occur at very low densities and only in particular habitats on Selati and therefore, it is no surprise that we only captured one event of a klipspringer. Across all three camera trap surveys we have recorded a total of 26 prey species and 14 carnivore species.

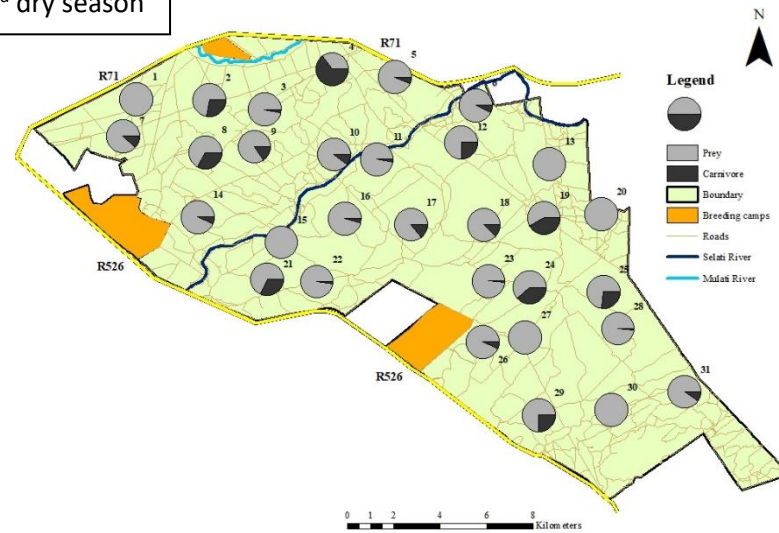
**Table 2:** Summary data from the first and second dry season and the first wet season camera trap surveys conducted in Selati Game Reserve.

	1 <sup>st</sup> Dry season		1 <sup>st</sup> Wet season		2 <sup>nd</sup> Dry season	
	(8th June to 7 <sup>th</sup> Aug 2016)		(5 <sup>th</sup> Jan to 7 <sup>th</sup> March 2017)		(1 <sup>st</sup> June to 2 <sup>nd</sup> August 2017)	
	n	%	n	%	n	%
No. trapping nights	1805	-	1709	-	1780	-
Total no.images captured	3458	-	4031	-	3583	-
Total prey events	1660	100	1821	100	1931	100
Small prey (<30kg)	277	16.69	257	14.11	351	18.18
Medium prey (30-90kg)	586	35.30	810	44.48	847	43.86
Large prey (>90kg)	532	32.05	501	27.51	487	25.22
Megaherbivores (>1000kg)	265	15.96	253	13.89	246	12.74
Total carnivore events	306	100	237	100	403	100
Small carnivore (<10kg)	19	6.21	27	11.39	31	7.69
Medium carnivore (10-20kg)	118	38.56	105	44.30	185	45.91
Large carnivore (>20kg)	169	55.23	105	44.30	187	46.40
Total mammal species	36	-	36	-	36	-
Total prey species	22	-	24	-	23	-
Total carnivore species	14	-	12	-	13	-

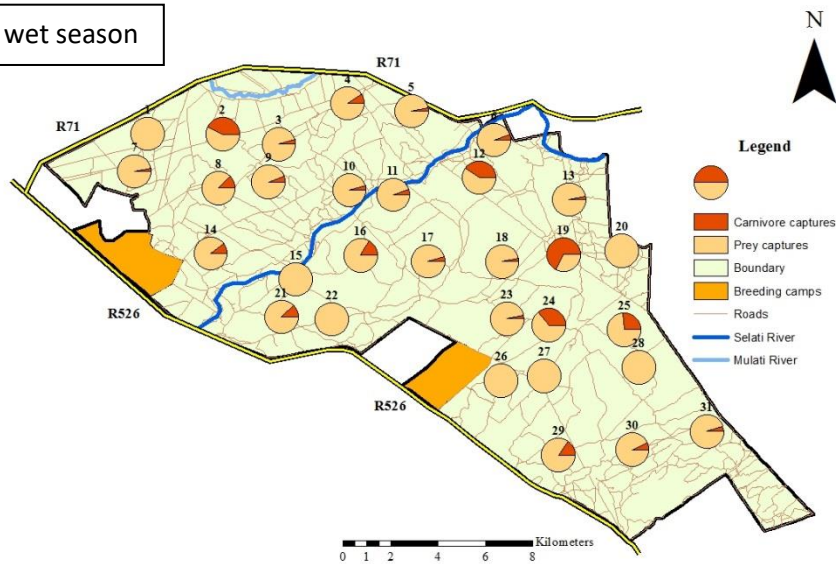
1<sup>st</sup> dry season



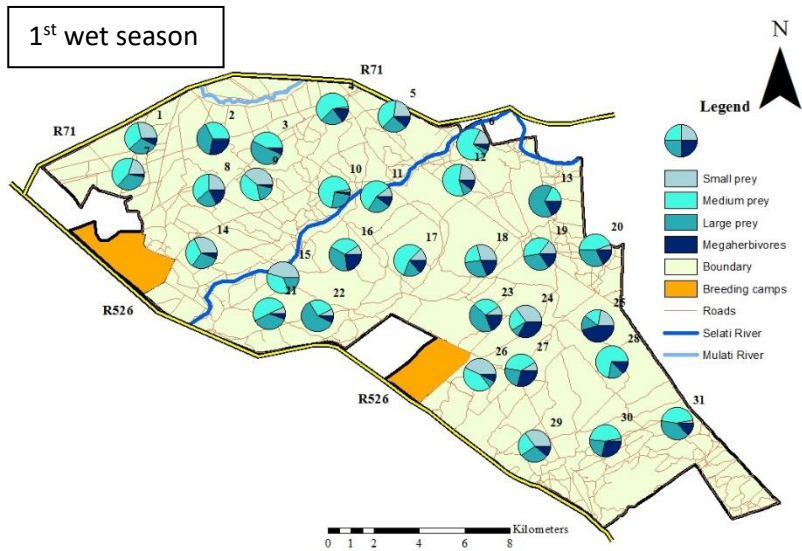
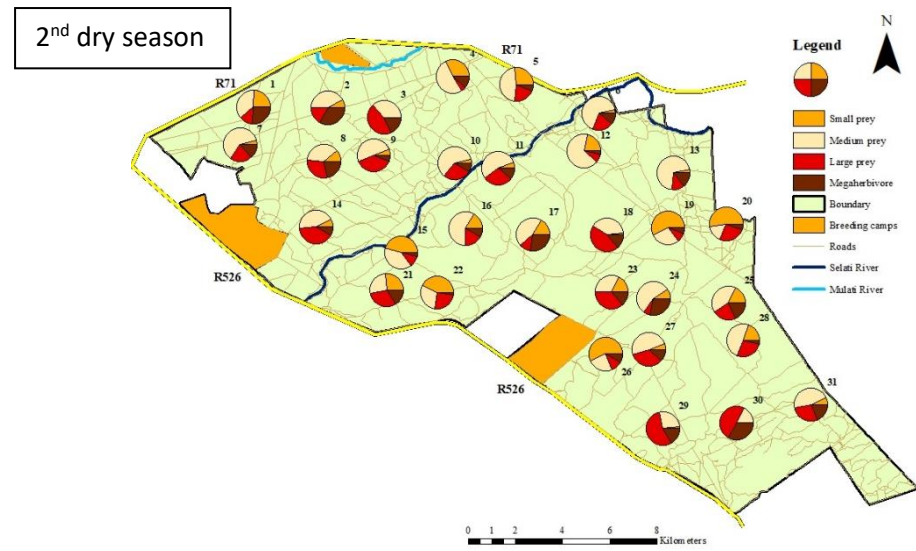
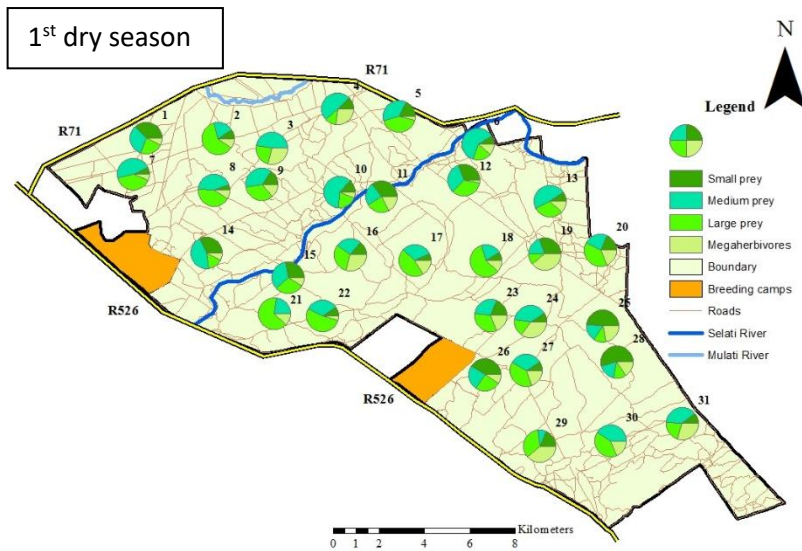
2<sup>nd</sup> dry season



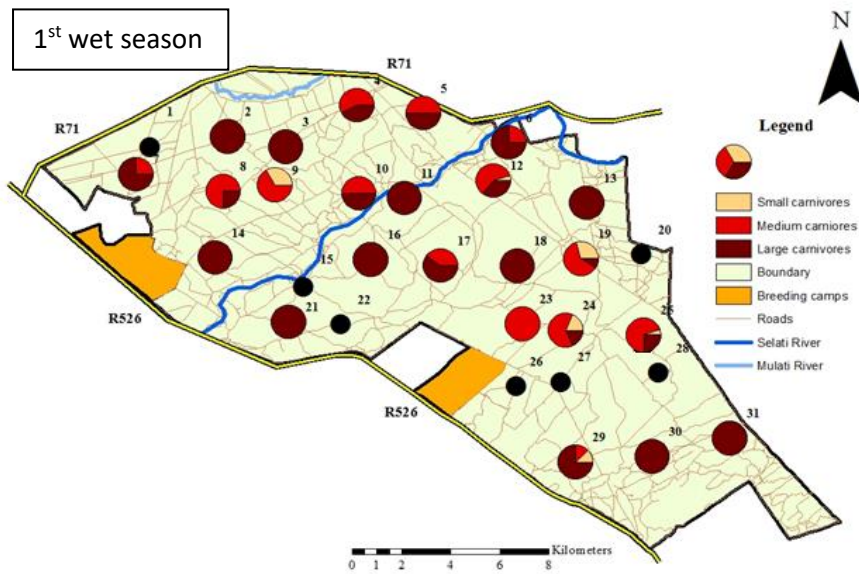
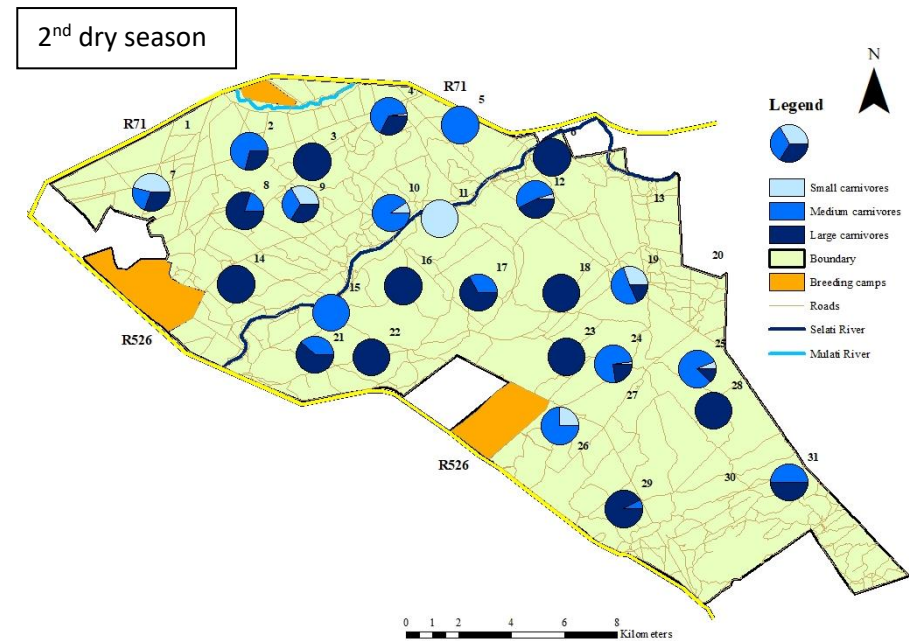
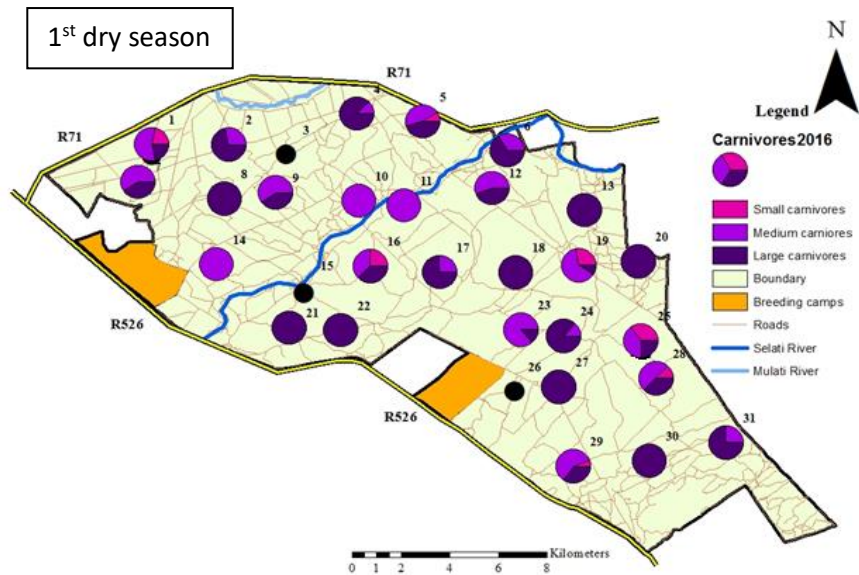
1<sup>st</sup> wet season



**Figure 1:** Comparison of total capture events of prey and carnivore species at each of the 31 camera trap sites in Selati Game Reserve during the first dry season, first wet and second dry season sampling periods.



**Figure 2:** Total capture events of small, medium and large prey species including megaherbivore species at each of the 31 camera trap sites during the first dry season, first wet season and second dry season sampling periods in Selati Game Reserve.



**Figure 3:** Total capture events of small, medium and large carnivore species at each of the 31 camera trap sites during the first dry season, first wet season and second dry season sampling periods in Selati Game Reserve

As with the previous two sampling sessions, prey species were captured throughout the reserve, with medium sized prey having the highest percentage of captures (Figure 1). Interestingly, when looking at the percentage of captures between all prey and carnivore species at each camera trap site, there are always more prey events than carnivore events, except for one site each season (Figure 1). It is also interesting to note that during both dry seasons this site was north of the river and during the wet season the site was south of the river (Figure 1).

Once again, as was observed during the two previous sampling sessions, camera trap sites which only captured large carnivores, either large or medium (or both) sized prey had the most number of capture events (Figure 2). This enhances our suspicions that the large carnivores on Selati are utilising areas of the reserve, which are resource rich. In addition, at sites where small carnivores were captured, the dry season once again always had more medium carnivores captured than large carnivores (Figure 3). This could therefore, indicate that the large carnivores are indeed influencing the spatial dynamics of the smaller, less dominant carnivores through intra-guild competition. What is very fascinating about the second dry season sampling session is that site 11 is the only camera trap site throughout all sampling sessions to only capture small carnivores (Figure 3).

In order to gain a better understanding of the spatial distributions of the prey and carnivore species and the possible influence of season, statistical analyses will be conducted after the final sampling session (second wet season) is conducted between January and March 2018.

### Leopard

A total of 35 leopard photographs were captured during the second dry season camera trap survey, which is similar to the first wet season survey ( $n = 36$ ) but nearly double that was captured during the first dry season survey ( $n = 18$ ). Once again, the majority of the photographs were of the left-hand side of the leopards ( $n = 26$ ) during the second dry season survey. From these 26 photographs two photographs were of poor quality and could not be used to reliably identify an individual (e.g. Figure 4). From the remaining 24 photographs 8 adult individuals were identified, of which four were recaptured individuals (male = 1, female = 2, unknown = 1; Figure 5) and four were newly identified individuals. Therefore, the total number of individually identified leopards from left-hand side photographs is now 18. Of the four newly identified leopards one was a female and the other three could not be sexed. From the 24 photographs two cubs were captured (Figure 6).

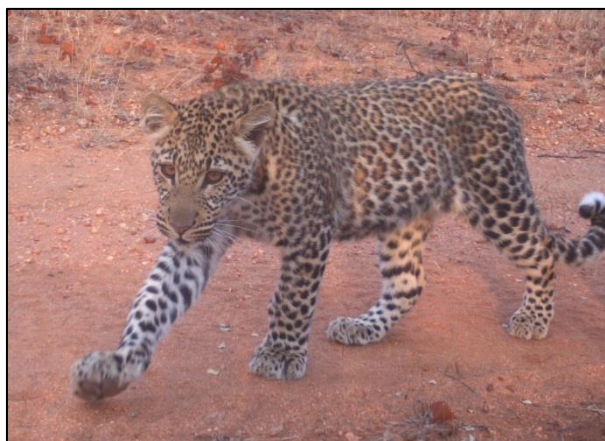




**Figure 4:** An example of a poor quality leopard photograph



**Figure 5:** Photographs of one of the recaptured female leopards (left) and the recaptured male leopard (right)



**Figure 6:** The two leopard cubs captured

From the nine right-hand side photographs of leopards, four individuals were identified of which two were recaptures (one male and Cleo (female); Figure 7), meaning two were newly identified individuals (one male and one unknown). The total number of individually identified leopards from right-hand side photographs is 15.



**Figure 7:** Photographs of the recapture male leopard (left) and Cleo (right).

### Spotted hyena

A total of 169 spotted hyena photographs were captured throughout the second dry season camera trap survey. Interestingly the first dry season (n=164) survey produced similar captures for spotted hyenas, where as the first wet season survey produced much less captures (n=81). Similarly to the first dry and wet season sampling periods, the left-hand side photographs made up the majority of the photographs (n = 92). A total of 32 individual spotted hyenas were identified, of which 15 individuals were recaptures (Figure 8) and the remaining 17 were new individuals (Figure 9). The total number of individually identified spotted hyenas from left-hand side photographs is 52.



**Figure 8:** Photographs of two of the 15 recaptured spotted hyena individuals.



**Figure 9:** Photographs of two of the 17 newly identified spotted hyena individuals.

From the 77 right-hand side photographs of spotted hyenas, 22 new individuals were identified and four individuals were recaptured. The total number of individual spotted hyenas from right-hand side photographs is 32.

**Scat collection:**

A number of scats have been opportunistically collected throughout the reserve and below is a summary of the number of scats collected so far for each species (Table 3).

**Table 3:** A representation of how many scats have been collected for each carnivore species

Species	Number of scats collected
Genet	4
Cheetah	1
Jackal	5
Caracal	5
Serval	5
Civet	9
Lion	12
Leopard	20
Spotted hyena	32
Uncertain	4

### **Collar data:**

To date four lions (two male and two female), four leopards (one male and three females) and four spotted hyenas have been collared (Table 4). The lion collars are working perfectly as they are habituated to the presence of vehicles and people and their collars can easily be downloaded in the field. Concerning the leopards and spotted hyenas, however, we seem to be having some difficulty with the consistency of collecting data from their collars, as these animals are not as habituated to the presence of vehicles or people. The AWT GSM collars only seem to be able to store data for up to 5 or 6 months, which is proving to be problematic and something we did not know when purchasing the collars. Plans are in order to try and get these data collecting issues resolved. Unfortunately, hunters shot one of the collared spotted hyenas, but fortunately, we were able to retrieve the collar and place the collar onto a new individual.

An animal's home range and core area, which is utilized more intensely, can be determined by using an acclimation of 95% and 50% of their GPS fixes respectively. Therefore, from the maps in Figure 10 it is evident that the male lion's home ranges nearly encompass the entire reserve and are the largest of all the collared animals. Additionally both male lions, but particularly Dela's home ranges include areas outside of Selati's boundary (Figure 10). The core areas of the male lions are however, both in the centre of the reserve and almost overlap completely (Figure 10). As expected the female lions home ranges and core areas are smaller than the males and are slightly more centralised within the reserve (Figure 10).

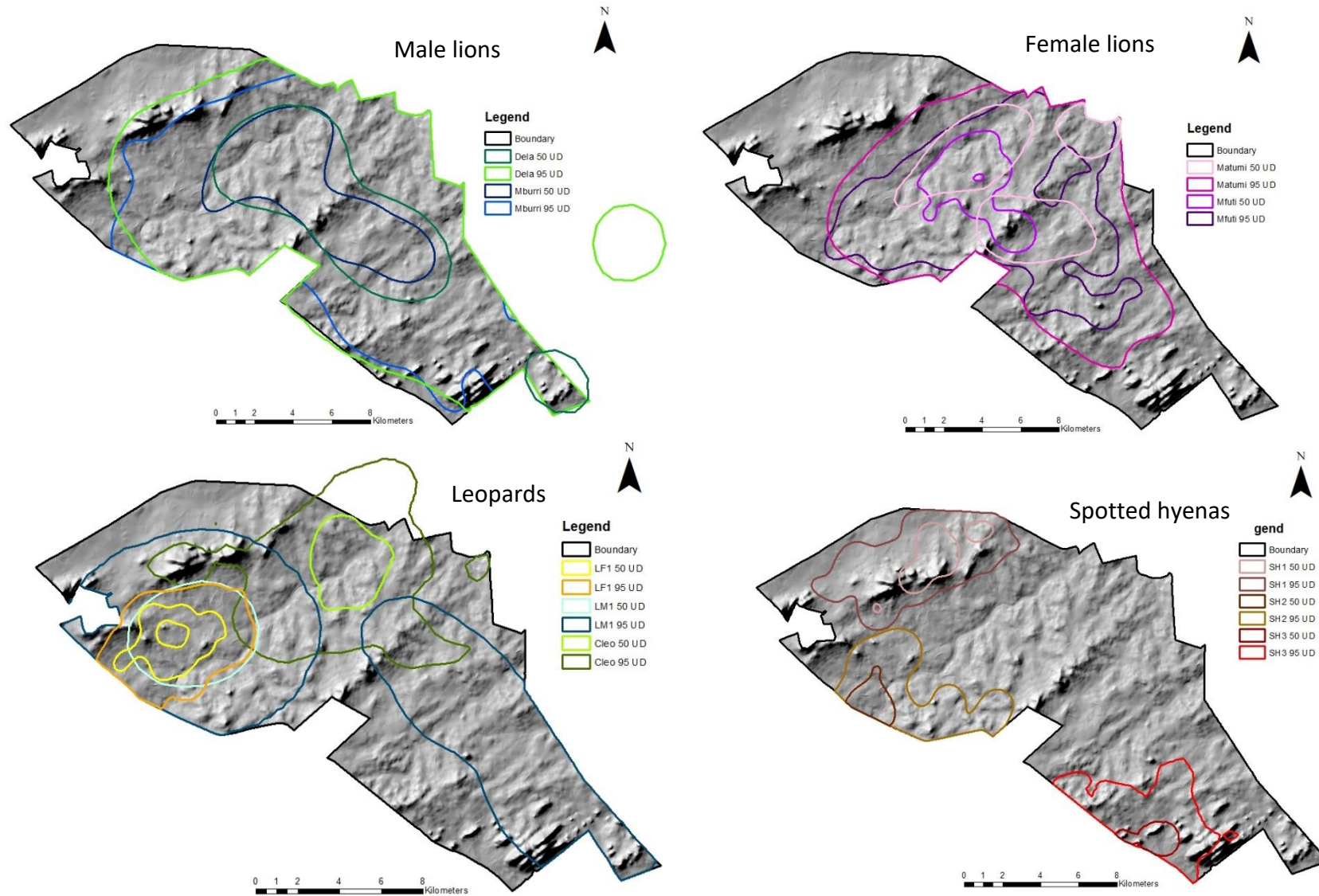
The leopard home ranges and core areas are much smaller than that of the lions, which is expected. Unfortunately, the only male leopard collared to date left Selati after three months of being collared, which means comparisons between male and female leopards cannot be made (Figure 10). Cleo is the only female leopard thus far to have a portion of her home range occur outside of Selati (Figure 10).

With regards to the spotted hyenas, there is limited data as two of the collars need to be cleared. However, it is still interesting to note how the home ranges and core areas of the spotted hyenas and the core areas of lions do not overlap (Figure 10). This leads us to suspect that there is carnivore intra-guild competition occurring on Selati in terms of space use between spotted hyenas and lions.

**Table 4:** Summary of collared large carnivores on Selati Game Reserve.

Species	Name	Sex	GSM	Telemetry	Date collared	GPS data until	Method of collaring	Comments
Lion								
	Mburri	M	1733	149.1600	09/09/16	30/10/17	Free dart	
	Dela	M	2019	148.5100	29/05/17	20/11/17	Free dart	
	Matumi	F	2020	148.5300	29/04/17	18/11/17	Free dart	
	Mfuti	F	1734	149.1900	16/09/16	11/09/17	Free dart	
Leopard								
	LM1	M	1735	149.2300	16/09/16	26/11/16	Baited cage	Moved out of Selati
	LF1	F	1737	149.4300	22/09/16	05/06/17	Baited cage	Collar needs to be cleared
	Cleo (LF2)	F	2012	148.2400	08/06/17	19/11/17	Baited cage	
	LF3	F	1739	149.8900	15/06/17	N/A	Baited cage	Collar needs to be cleared
Spotted hyena								
	SH1	U	1736	149.3700	16/19/16	06/05/17	Free dart - helicopter	Shot 07/06/17
	SH2	U	1738	149.6500	02/05/17	14/05/17	Baited cage	Collar needs to be cleared
	SH3	U	2011		02/05/17	20/11/17	Transmitter dart	
	SH4	U	1736	149.3700	15/06/17	N/A	Transmitter dart	Collar needs to be cleared

**Collar data:**



**Figure 10:** The home ranges (95 UD) and core areas (50 UD) of all collared animals with GPS data.

## **Kill sites:**

Large carnivore kill data can be collected using the Global Positioning System (GPS) cluster method or through the opportunistic location of kill sites in the field. GPS data fixes (GPS clusters) from collared large carnivores can be used to provide valuable insight into these animals diet and prey selection. GPS clusters are defined as two or consecutive recorded times with each pair of fixes being less than 100m apart. ArcGIS is used to plot location fixes and sequentially identify potential GPS/kill clusters. Once potential clusters/kill sites are identified, cluster co-ordinates are uploaded onto a handheld GPS unit and investigated on foot for prey remains. Potential predation events are usually identified from the presence of prey stomach contents, teeth, hooves, hair or bones.

Locating kill sites has proven to be less successful than hoped, as only 15 lion kill sites, and five leopard kill sites have been found. A possible reason for the lack of locating kill sites could be because of the high spotted hyena density on the reserve. Although spotted hyenas are known to hunt, they are also opportunistic scavengers and could be easily carrying away the carcasses of the lions and especially the leopards, who predominantly hunt small to medium prey species.

**Table 5:** Lion kill site information located at GPS fixes on Selati Game Reserve

	Animal ID	Date*	S	E	Kill		
					Species	Sex	Age
1	Mburri & Mfuti	01/04/2017	-23.971610	30.71862	Waterbuck	M	A
2	Mfuti	04/04/2017	-23.965797	30.0000	Tortoise		
3	Mburri	09/04/2017	-23.963780	30.72833	Eland	M	A
4	Mburri & Dela	26/04/2017	-24.001748	30.81423	Waterbuck	M	A
5	Dela	30/04/2017	-23.953696	30.73689	Warthog	U	A
6	Mfuti	03/05/2017	-23.972390	30.733818	Impala	M	A
7	Mburri & Dela	05/05/2017	-23.953696	30.73689	Warthog	U	A
8	Mburri & Dela	23/05/2017	-23.944314	30.76169	Kudu	A	M
9	Dela & Mburri	01/08/2017	-24.003762	30.81940	Giraffe	U	J
10	Lion	08/06/2017	-23.957093	30.71952	Waterbuck	U	A

11	Lion	19/07/2017	-23.964400	30.67643	Waterbuck	M	A
12	Mfuti	23/07/2017	-23.944314	30.76169	Waterbuck	U	A
13	Mfuti, Matumi, Acacia & cubs	27/07/2017	-23.990366	30.81970	Wildebeest	U	A
14	Dela	31/07/2017	-23.99081	30.79169	Wildebeest	U	A
15	Dela		-24.01060	30.82182	Warthog	U	A

\*Date represents the date the kill was made and not located

**Table 6:** Leopard kill site information located at GPS fixes on Selati Game Reserve

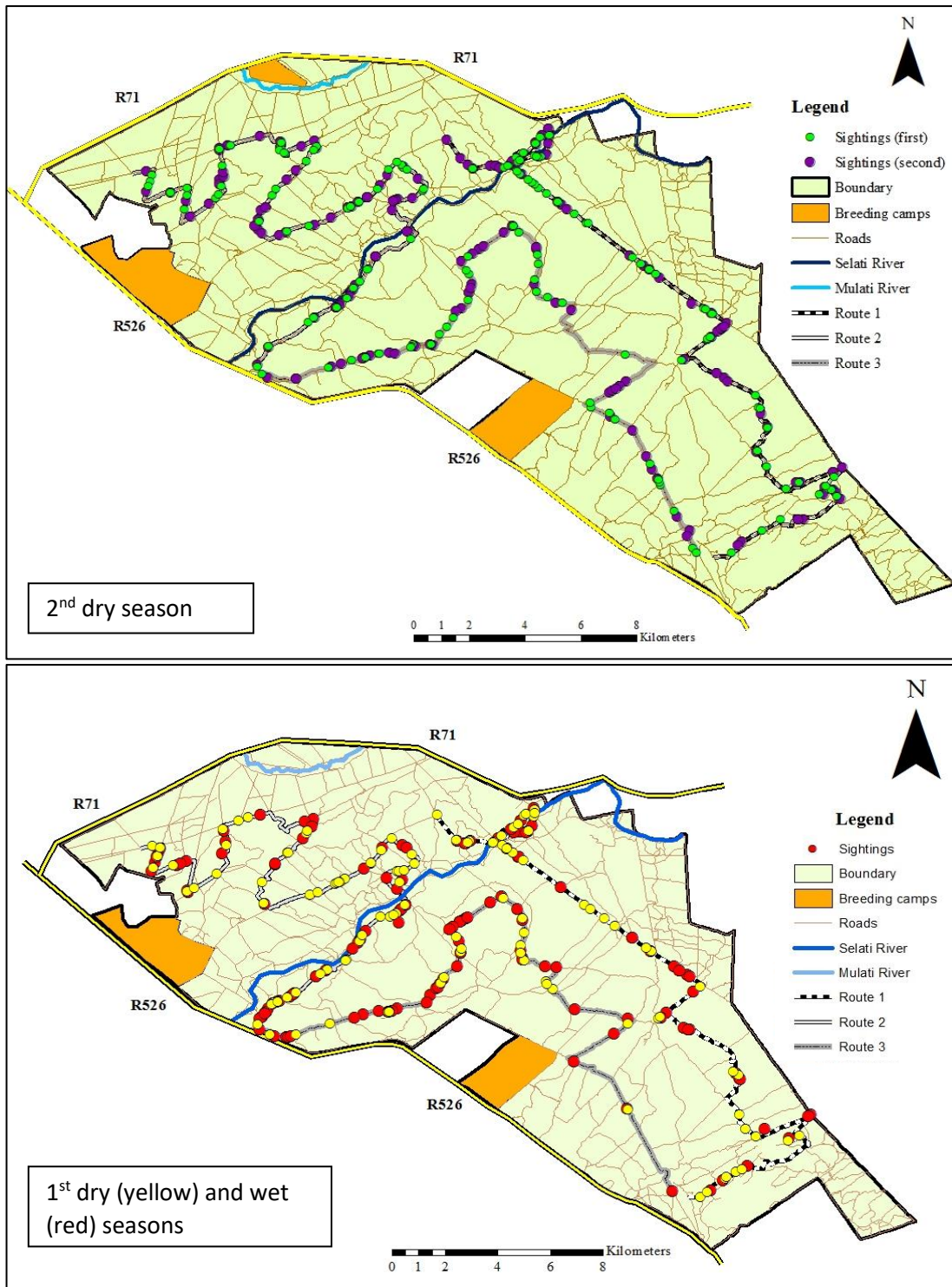
Animal				Kill			
ID	Date*	S	E	Species	Sex	Age	Comments
1	LF1	15/04/2017	-23.974048	30.710165	Warthog	U	A
2	Cleo	25/06/2017	-23.930850	30.77627	Impala	U	A
3	Leopard	30/07/2017	-23.931156	30.80830	Impala	F	A
4	Leopard	June 2017	-23.953696	30.73689	Nyala	F	A
5	Leopard	June 2017	-23.953696	30.73689	Nyala	M	A

\*Date represents the date the kill was made and not located

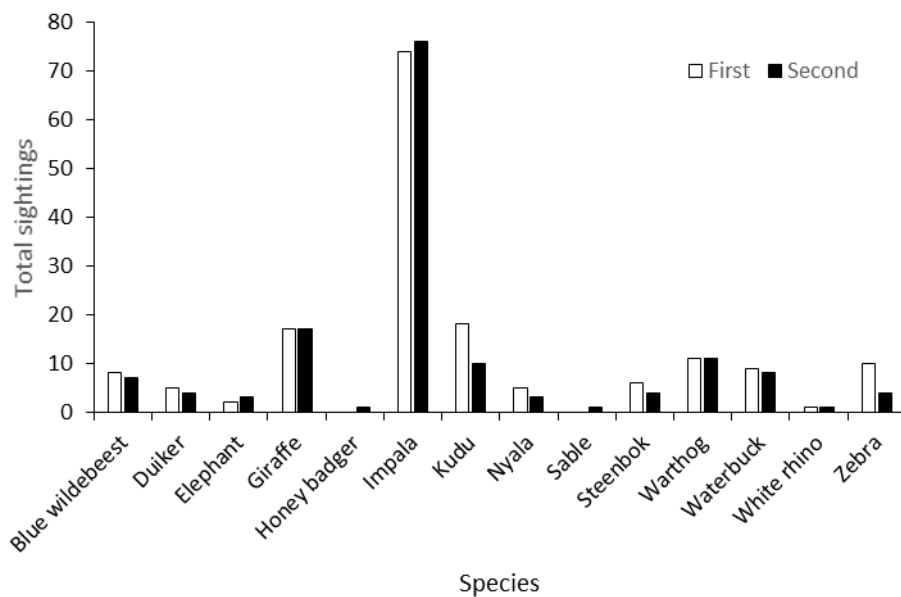


### **Road-trip count:**

During this sampling period we conducted the road-strip count twice, meaning each route was driven four times instead of only twice. As was observed in the previous two sampling sessions (first wet and dry seasons), Route 3 had the least number of animal sightings (Figure 10). There do seem to be seasonal differences, as during both dry season sampling sessions Route 1 produced the greatest number of sightings, whereas during the wet season Route 2 produced the greatest number of sightings. Interestingly during the second dry season sampling session, there were more sightings made in the south than in the two previous sampling sessions. During our first road-strip count of the second dry season sampling session 11 mammal species were identified, which was similar to the previous two sampling sessions. However, during the second road-strip count of the second dry season sampling session, 14 mammal species were identified including a newly recorded species for the road-strip counts, which was a honey-badger (Figure 11).



**Figure 11:** Map depicting where sightings of animals were counted along the three road-strip routes during the various sampling periods.



**Figure 12:** Total number of sightings for each species from the first and second road-strip count survey done during the second dry season.

**Conclusion:**

The final camera trap survey (second wet season) and road-strip count will take place between January and March 2018. Increased efforts will be placed on the collection of scats and kill sites during the second wet season sampling period as very few were collected during the first wet season due to ecological changes which occur. If additional scats and kill site data is required after the second wet season sampling period, an additional fieldtrip to Selati will be conducted between June and July 2018.

The rodent diversity of Selati is currently unknown. In order to accurately determine the diet of carnivores such as leopards, black-backed jackal, side-striped jackal or even spotted hyena, which may feed on rodents, it is important for us to know which rodents are found throughout Selati. Therefore, a rodent trapping survey, with the use of Sherman live traps baited with a mixture of oats and peanut butter will take place during the upcoming fieldtrip to gain insight into the rodent diversity of Selati.