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ANNUAL REPORT

NOVEMBER 2008

by Dr. Ingrid Wiesel

TABLE OF CONTENTS

Annual Report

INTRODUCTION

Thirteen brown hyenas and one spotted hyena have been fitted with GPS telemetry collars since 2003. Data retrieved from these collars provides detailed information about brown hyena ecology and behaviour in the project's study areas.

Since the start of the Brown Hyena Research Project (BHRP) in 1997 we managed to fill many gaps between study areas and are in the process of being able to look at the Sperrgebiet brown hyena population in total. This will have major conservation impacts. For example, our data indicates that the distribution of permanent and periodic water sources is more important to brown hyenas than previously suggested by other researchers. Furthermore, brown hyenas occupying territories in inland areas of the Sperrgebiet also make use of the coast on regular excursions out of their territory, with travelling distances reaching more than 50 km to reach the coastal food sources. After establishing baseline information about brown hyena occurrence, abundance, home range size and habitat use in the Sperrgebiet, we will be able to look into other ecological fields by expanding research into interspecific relationships between brown hyenas and their prey species (herbivores) and competitors (e.g. spotted hyena, leopard, black-backed jackal). Furthermore, we have established the first genetic profile of Namibian brown hyenas and by expanding the study area to cover the entire Sperrgebiet, we will be able to obtain data to detect the populations' viability, to determine relatedness between clan members and clans and to identify movement between populations.
During the past eleven years of study, we detected the limitations and adaptabilities of brown hyenas in the coastal areas of the Sperrgebiet. It is clear, that, although seals are an abundant and permanent food source, the brown hyena population is limited by other factors than food availability and quality. Intra- and interspecific competition, habitat limitations and the general clan structure seems to influence its population growth. Further studies in this unique ecosystem are necessary to widen the knowledge.

With the imminent proclamation of the Sperrgebiet as a National Park, the project's data becomes even more important and many aspects of our studies will contribute to and aid in the future monitoring of the brown hyena as a flagship species of the Park.

HABITAT USE OF HYENAS IN THE SPERRGEBIET AREA

The insight into the hyenas' habitat selection is important to protect and possibly restore key habitats used by hyenas. The most appropriate way of determining key habitats is to identify habitats that are disproportionally used in relation to these habitats' availability. Unfortunately fine-scaled and detailed digital maps of the Sperrgebiet area's habitats are not available yet, but the BHRP has started to create such maps. However mapping progress is slow and first data will only be available next year. Nevertheless, the BHRP related behavioural data with habitat use data to obtain information about habitat use with regard to different behaviours (moving, eg. foraging, territory boundary patrol; and non moving, eg. resting). It was determined how much time per day each hyena spent moving and non moving. If all available habitats within a hyena's home range were equally used for both behaviours, the moving/non-moving ratio should be reflected in the numbers of positions taken in each habitat type for each of the two behaviours.

Table 1: Habitat selection of hyenas when moving and not moving (ns = no significant difference in habitat use). Green marked fields indicate habitat types that were significantly more used by all hyenas while resting and blue marked fields indicate habitat types that were significantly more used by hyenas when moving. The use of the coastal area (from coastline to 10-15 km inland (using the main gravel road from Luderitz to Oranjemund as a reference) are indicated for coastal and inland hyenas. Habitat types were also divided into three groups: inland habitat types, coastal habitat types and other habitat types.

Species		Spotted hyena	Brown hyena						
Clan type		inland	coastal				inland	urban	nomad
Habitat type		Oona	Merlin	Halenge	Dollar	Django	Alfie	Gypsy II	Floggy
inland	dunes	ns				moving	moving		
	hummocks	non moving							
	koppie & mountains	non moving	non moving	ns		ns	non moving		non moving
	plains	moving	moving	moving		moving	moving		moving
	riverbed	ns					moving		
Others	saltpan	ns	ns	moving	ns	ns	moving	moving	
	ghost town		ns					ns	
	town							moving	
coast	coastal hills		non moving	non moving	non moving	non moving	non moving	non moving	ns
	coastal dunes		non moving	moving	ns	ns	non moving		ns
	coastal plains		moving	ns	moving	non moving	non moving	moving	ns
	hummocks			moving		ns	ns		ns
	seal colony		ns	ns	moving	moving	ns		ns
	coast		moving	moving	ns	moving	ns	moving	
	beach			moving					
percentage	coast	0	83	79	100	67	5		34
	inland	100	16	21	0	33	95		66

Two habitat types were important for resting hyenas: koppies and mountains in inland areas of the Sperrgebiet and hills in coastal parts of the Sperrgebiet (Table 1). The spotted hyena's preferred resting habitat were the large vegetated hummock dunes in the Koichab riverbed area. Hardly any resting took place in inland plains, which is the habitat type that covers most of the Sperrgebiet area. In coastal areas, brown hyenas predominately moved along the coast, patrolling the beaches or seal colonies for food.

Behaviourally related habitat use is much clearer defined in inland areas of the Sperrgebiet. The climate there differs from the climate along the coast and resting hyenas have to look for proper shelter while resting inland for thermoregulatory purposes.

For some hyenas differences in behaviourally related habitat use were detected between night and day (Halenge and Merlin: habitat use differed while moving at different times of the 24 hour period), at night (Dollar and Merlin) and during the day (Halenge).

ACTIVITY PATTERN OF BRWON HYENAS IN THE SPERRGEBIET AREA

The activity of animals is determined by many factors such as the air temperature, wind chill, degree of human disturbance and also the activity pattern and behaviour of prey animals.

Table 2: Mean (± SD), minimum and maximum daily distances moved by hyenas (grey marked fields: data set of only four days not used for subsequent analyses).

Species	Clan type	Hyena ID	Sex	Distance (km/h) Mean	SD	Minimum	Maximum
Brown hyena	coastal	Django	male	15.8	10.4	0.3	46.5
		Dollar	male	22.9	10.0	11.1	45.9
		Halenge	male	25.6	14.5	0.1	69.6
		Merlin	male	24.3	7.5	7.8	38.0
		Ray	male	14.7	7.8	0.0	47.6
		Rodin	male	25.8	13.1	0.3	62.3
	inland	Maya	female	18.5	15.0	4.0	38.5
		Alfie	male	46.7	17.2	6.2	89.0
		Caspar	male	35.9	15.5	0.5	71.8
	nomad	Floggy	male	18.6	13.1	0.2	47.7
	urban	Gypsy II	female	16.2	6.7	1.0	34.2
		Minerva	female	13.8	7.0	0.0	35.3
		Tosca	female	24.0	9.0	1.5	61.6
Spotted hyena	inland	Oona	female	26.9	11.4	1.1	64.3

The studied brown hyena population in the Sperrgebiet was divided into three categories: coastal hyenas, inland hyenas and urban hyenas. The latter group included animals, whose home ranges included the town of Luderitz. Daily variations in activity were great, from some

hyenas not moving at all during a 24 hour period to animals that travelled distances of close to 90 km in a 24 hour period (Table 2). Overall coastal brown hyenas travelled significantly less kilometres per 24 hour period than urban and inland ones, and urban brown hyenas travelled significantly less kilometres per 24 hour period than inland hyenas (Figure 1).

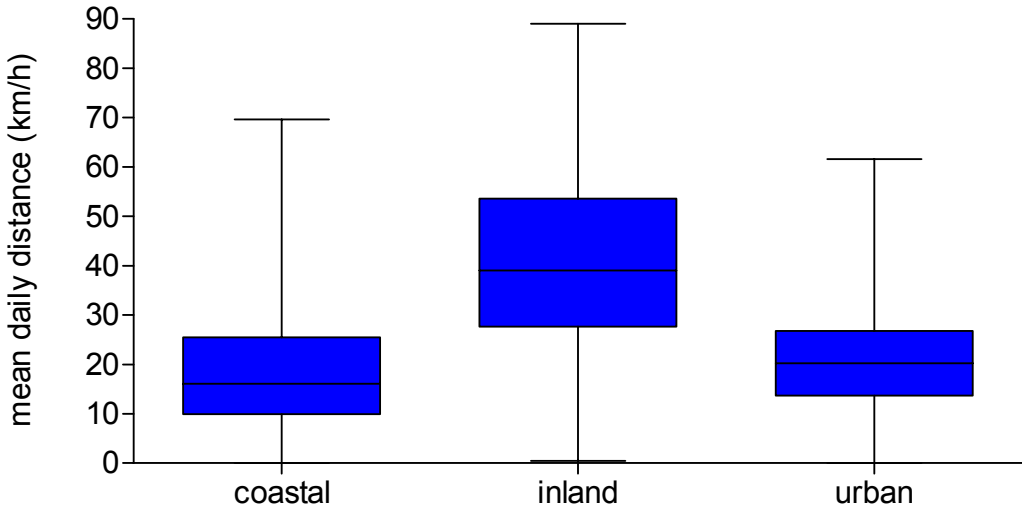


Figure 1: Mean daily distance (km/h) travelled by coastal, inland and urban brown hyenas.

All hyenas were predominately nocturnal. At night, mean hourly distances of 1.4, 3.0 and 1.7 km were travelled by coastal, inland and urban brown hyenas respectively (Figure 2).

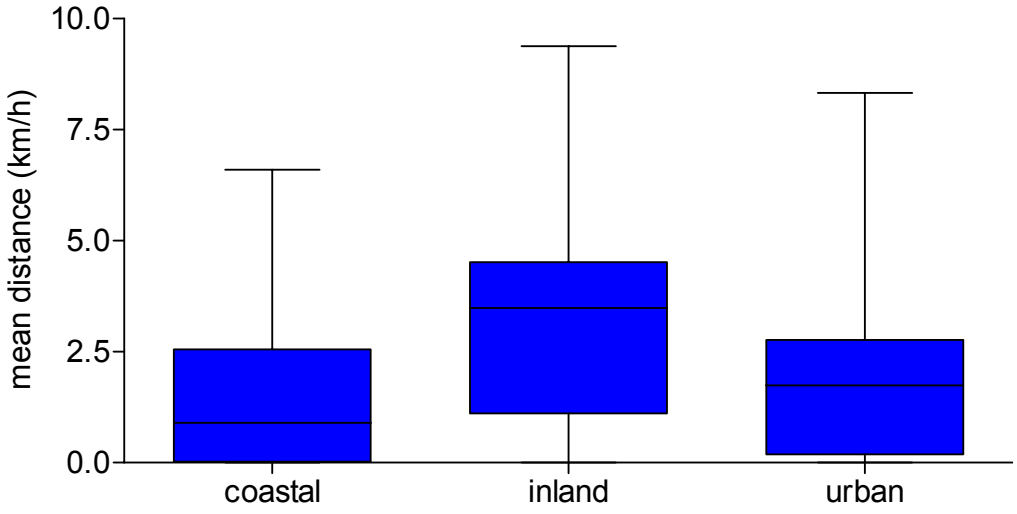


Figure 2: Mean hourly distances moved by brown hyenas at midnight.

The differences between the distances moved at midnight by brown hyenas of different clan types were significant. Coastal brown hyenas were the least active, followed by urban brown

hyenas that take an intermediate position and inland brown hyenas that travel significantly more at midnight than brown hyenas of the other two clan types.

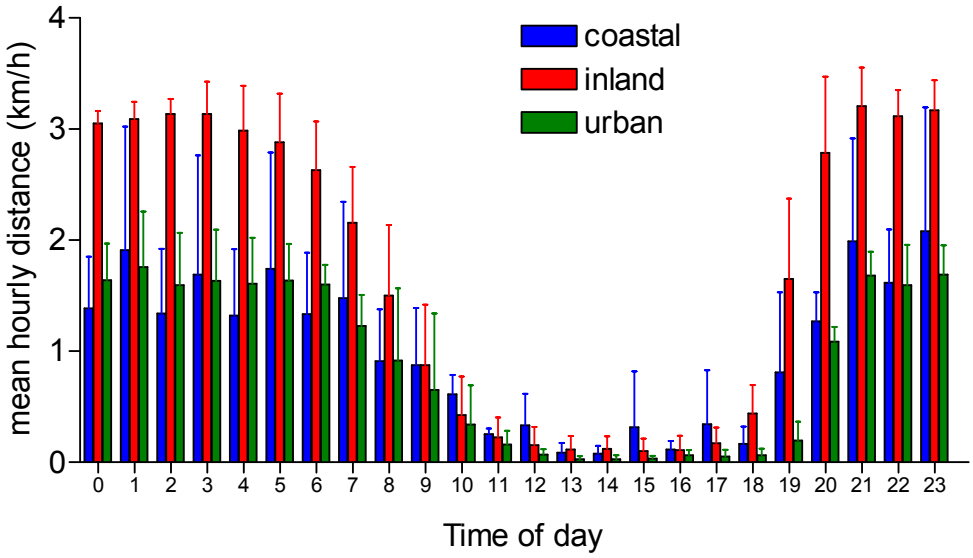


Figure 3: Activity pattern (mean hourly distance moved) of coastal, inland and urban brown hyenas.

Inland and urban brown hyenas were more nocturnal than coastal brown hyenas (Figure 3). At night inland and urban hyenas travelled on average greater distances per hour than coastal hyenas, but coastal hyenas travelled greater distances during the day than animals of the other two clan types.

Coastal and urban brown hyenas have predictable food sources along the coast and find most of their food while patrolling the beaches. Additionally all coastal brown hyenas have access to mainland Cape fur seal breeding colonies, which are a predictable, all-year round available food source; and urban brown hyenas make use of the town's rubbish dump. Hence the foraging distances of coastal and urban brown hyenas are smaller compared to the foraging distances of inland hyenas without predictable food sources in their home ranges.

Coastal brown hyenas can afford to be more active during the day as air temperatures are lower than in inland areas of the Sperrgebiet and there is less human disturbance in coastal areas than around the town of Luderitz.

Air temperatures influence brown hyena activity (example: Figure 4). Brown hyenas reduce activity with higher air temperatures and become more active when air temperatures are lower independent of the time of the day.

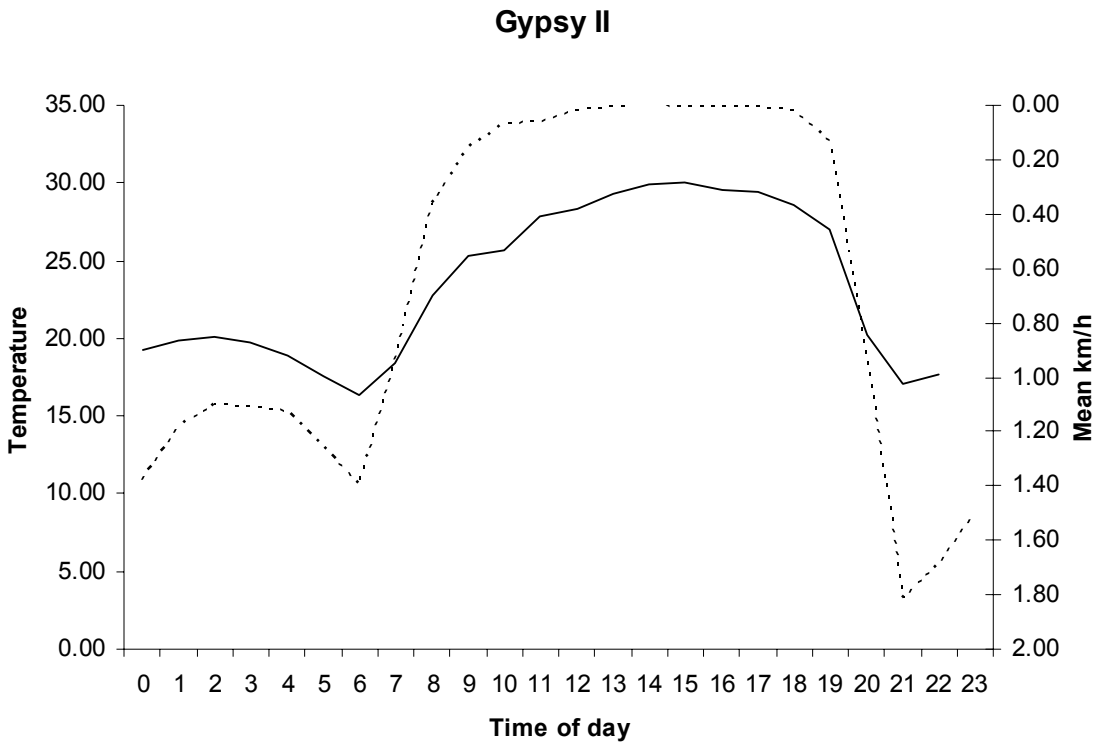


Figure 4: Air temperature (°C) and mean distance moved by Gypsy II during different times of the day.

BROWN HYENA DENNING BEHAVIOUR

Two lactating brown hyena females were fitted with GPS collars in 2006 and 2007. The first GPS collar was retrieved in December 2007 and the second one in May 2007. Data from the first retrieved collar has been analysed and for the first time detailed information about the denning behaviour of a lactating female is available.

Data collection started in August 2006 when the cubs were approximately three to four months old. The amount of time the lactating female “Tosca” spent at the den decreased with increasing age of the cubs (Figure 5). The same applied for the daily visits to the den.

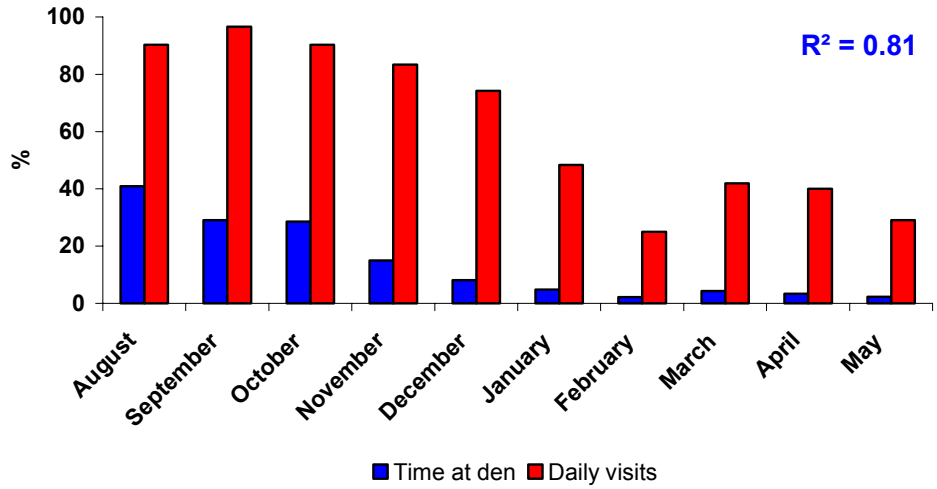


Figure 5: Percentage of time spent at the den site and percentage of daily visits to the den.

Tosca spent up to 16 hours per day at the den. The time she spent at the den was significantly longer when her cubs were young (August to October) compared to when her cubs were more than 9 months old (January to May) (Figure 6).

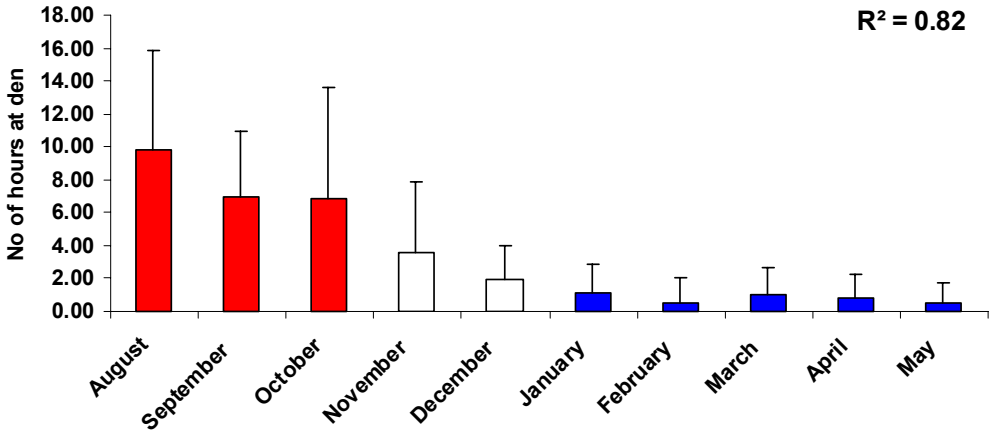


Figure 6: Mean (SD) number of hours spent at the den site during different months.

She also spent more time near the den (up to 0.5 km away) when the cubs were young. Her attendance pattern near the den decreased with increasing age of the cubs (Figure 7).

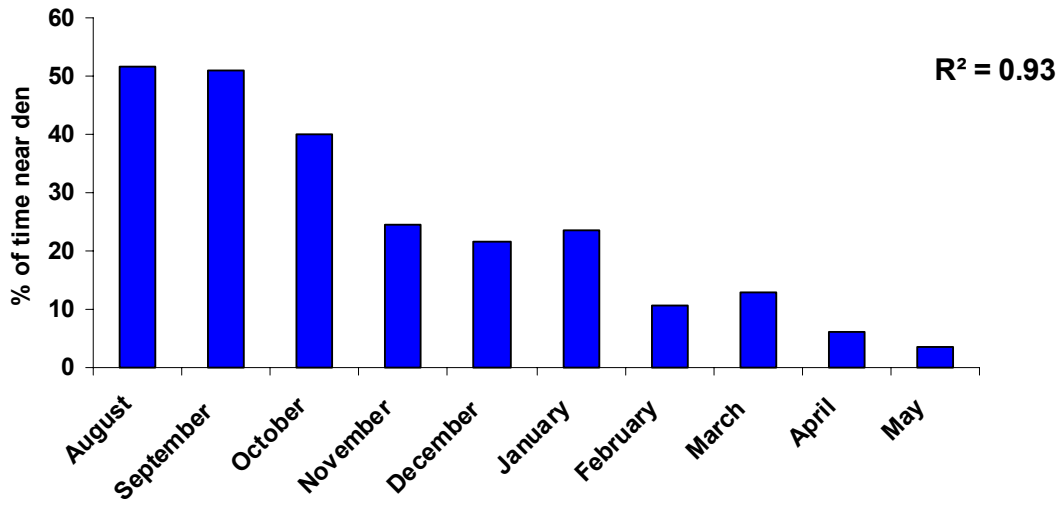


Figure 7: Mean percentage of time spent near the den site.

Surprisingly, despite spending most of her time at or near the den site when her cubs were young, her activity stayed the same throughout the lactating/denning period (Figure 8). She moved the same average distance per day independent of the age of her cubs. Therefore foraging effort stayed the same throughout the denning period.

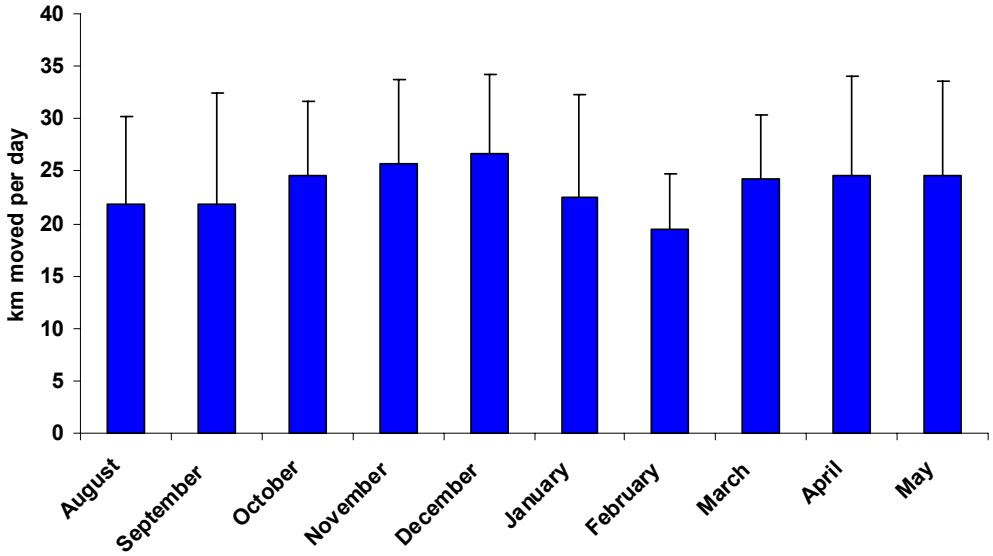


Figure 8: Mean daily distance moved by Tosca during different months.

Looking at Tosca's general attendance pattern at the den two peaks are visible (Figure 9). She spent most of the time at the den at sunrise and sunset, but also considerable time during the day.

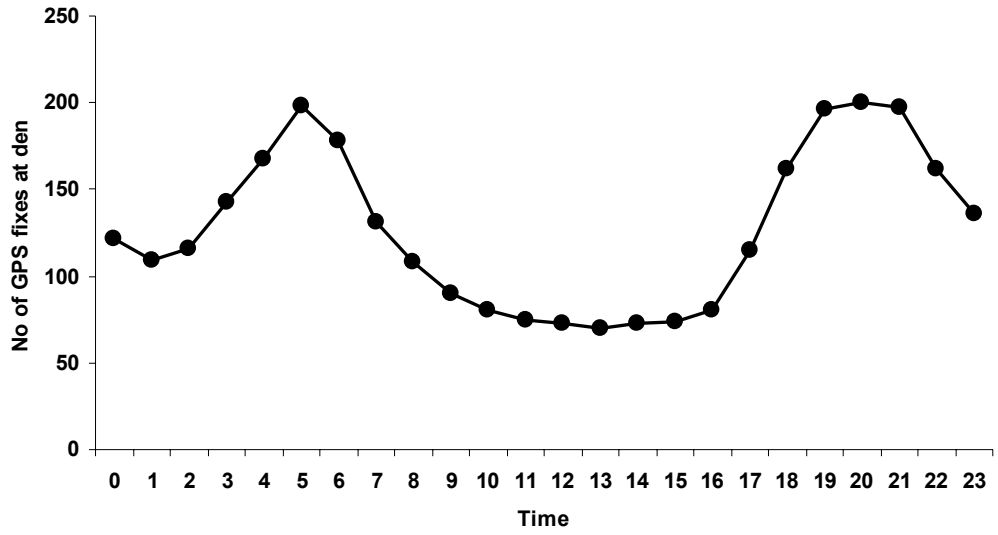


Figure 9: Attendance pattern at the den.

The analysis of the attendance pattern per month shows that Tosca spent less time at the den at night than during the day even when her cubs were young, giving her enough time to forage at night (Figure 10). Another interesting pattern is the shift in attendance peaks due to the change in sunrise and sunset times. Hence, Tosca's preferred time at the den was during these times.

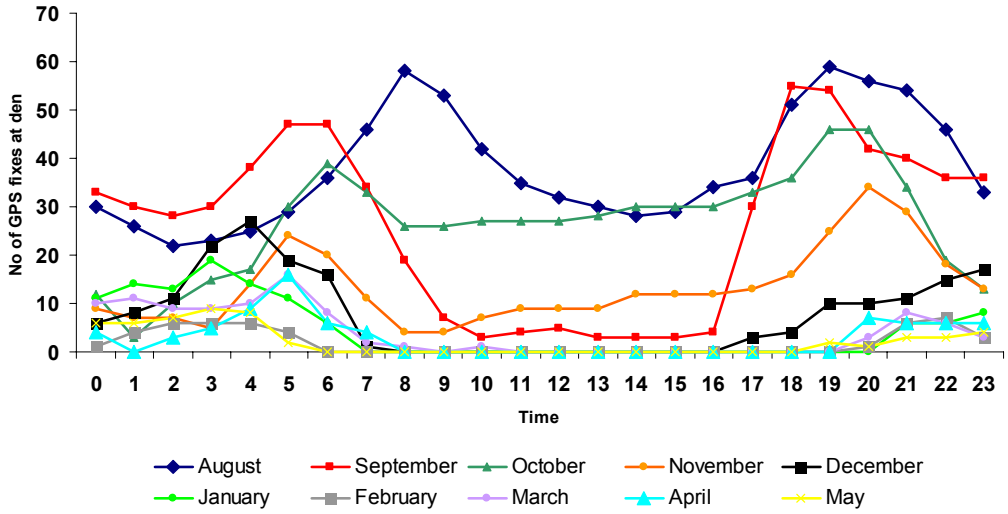


Figure 10: Attendance pattern at the den during different times of the denning period.

Tosca moved her cubs on seven occasions. Occasionally she used two dens that were close to each other at the same time. However, the time between moves increased with increasing age of the cubs (Figure 11).

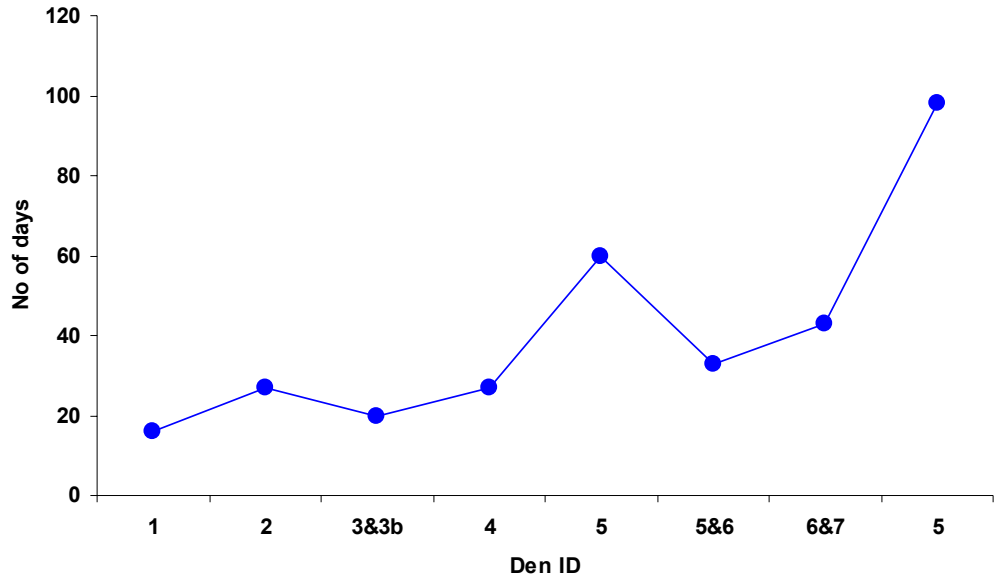
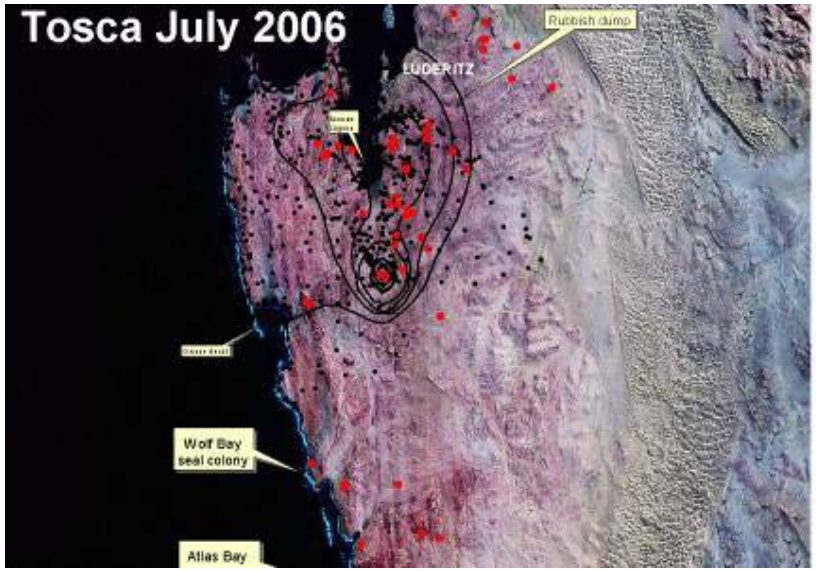
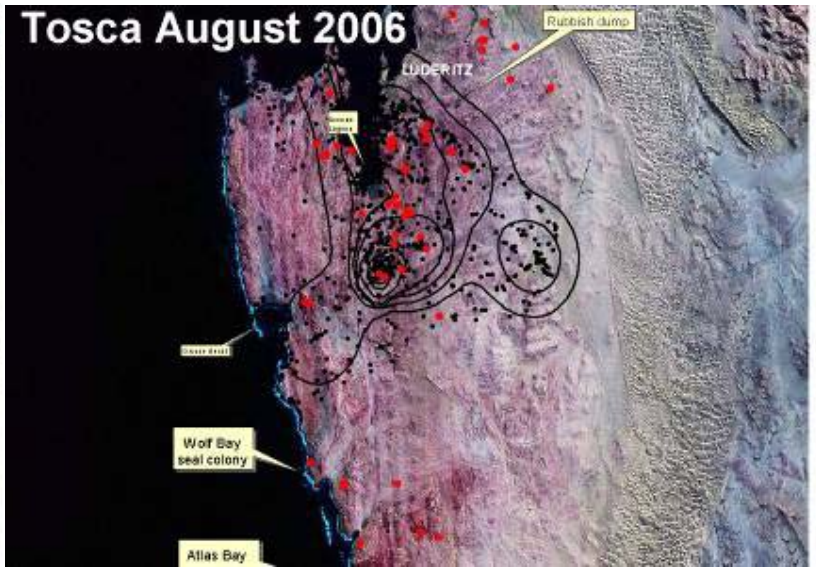


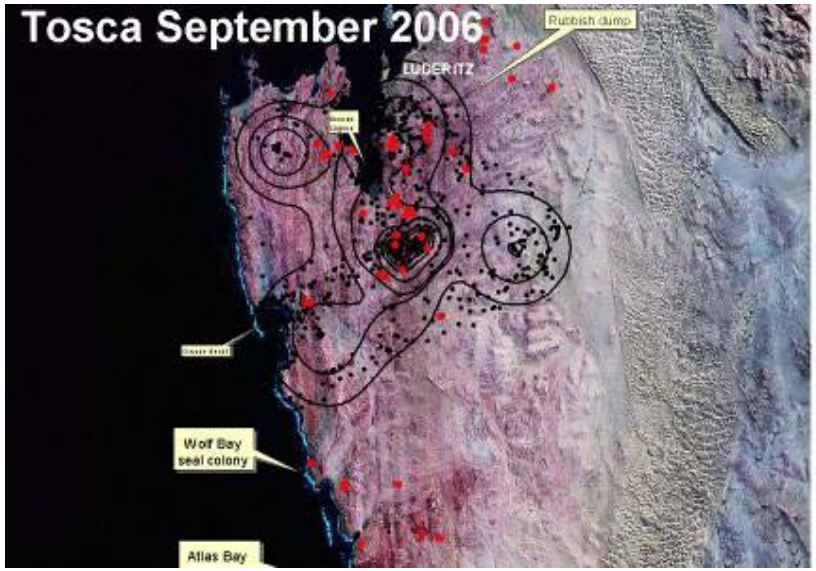
Figure 11: Den occupancy during the denning period.

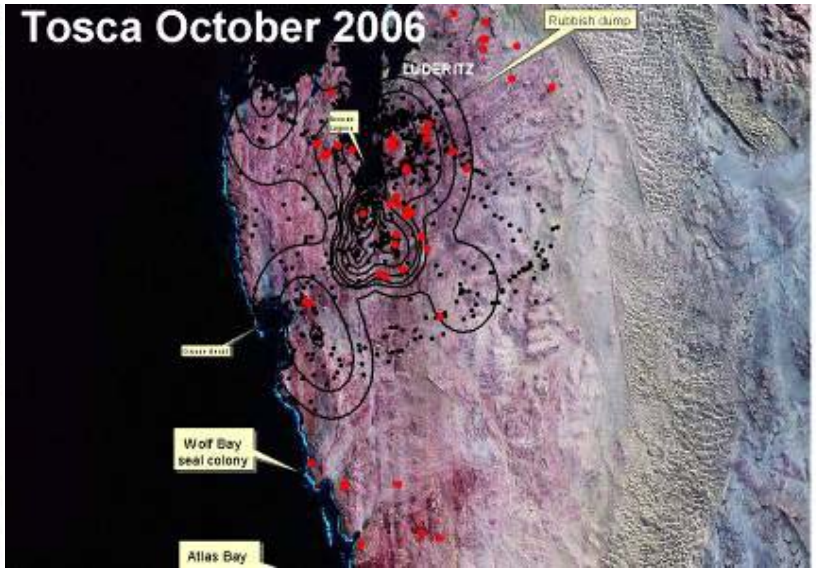
Figure 12 illustrates the changes in Tosca's home range size and home range use during different times of the denning period. Tosca's main foraging areas are the Second Lagoon and the bay Grosse Bucht. During the seal pupping season, she also forages at the mainland seal colony at Wolf Bay and forages extensively at the south-west facing beach Grosse Bucht, where seal carrion is washed up due to the prevailing ocean current. Tosca's home range size increases with the progressing denning period.

There are 36 known den sites in Tosca's home range and she used eight of those during the denning period, including three previously unknown ones. The furthest distance between used den sites was 3.4 km (Den 1 and Den 6).


Tosca July 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca August 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay

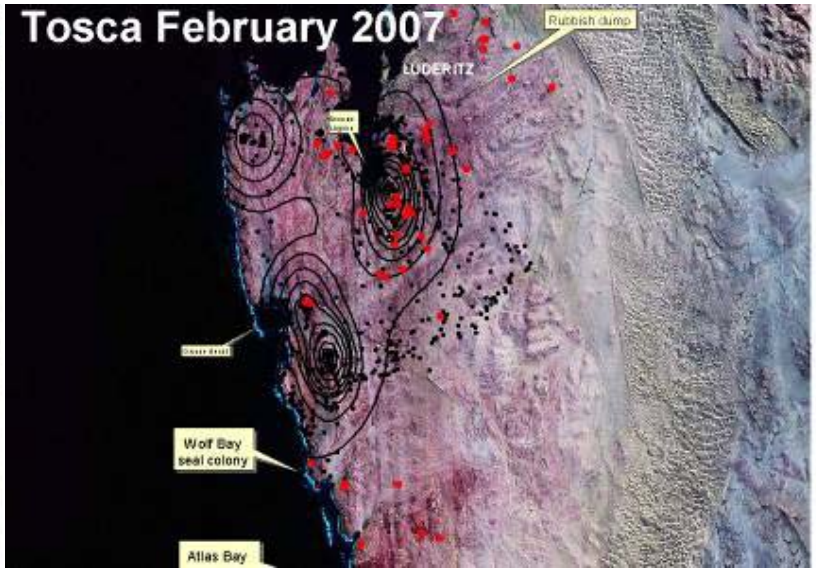

Tosca September 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca October 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca November 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca December 2006
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca January 2007
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay


Tosca February 2007
Rubbish dump
LUDERITZ
Wolf Bay
seal colony
Atlas Bay

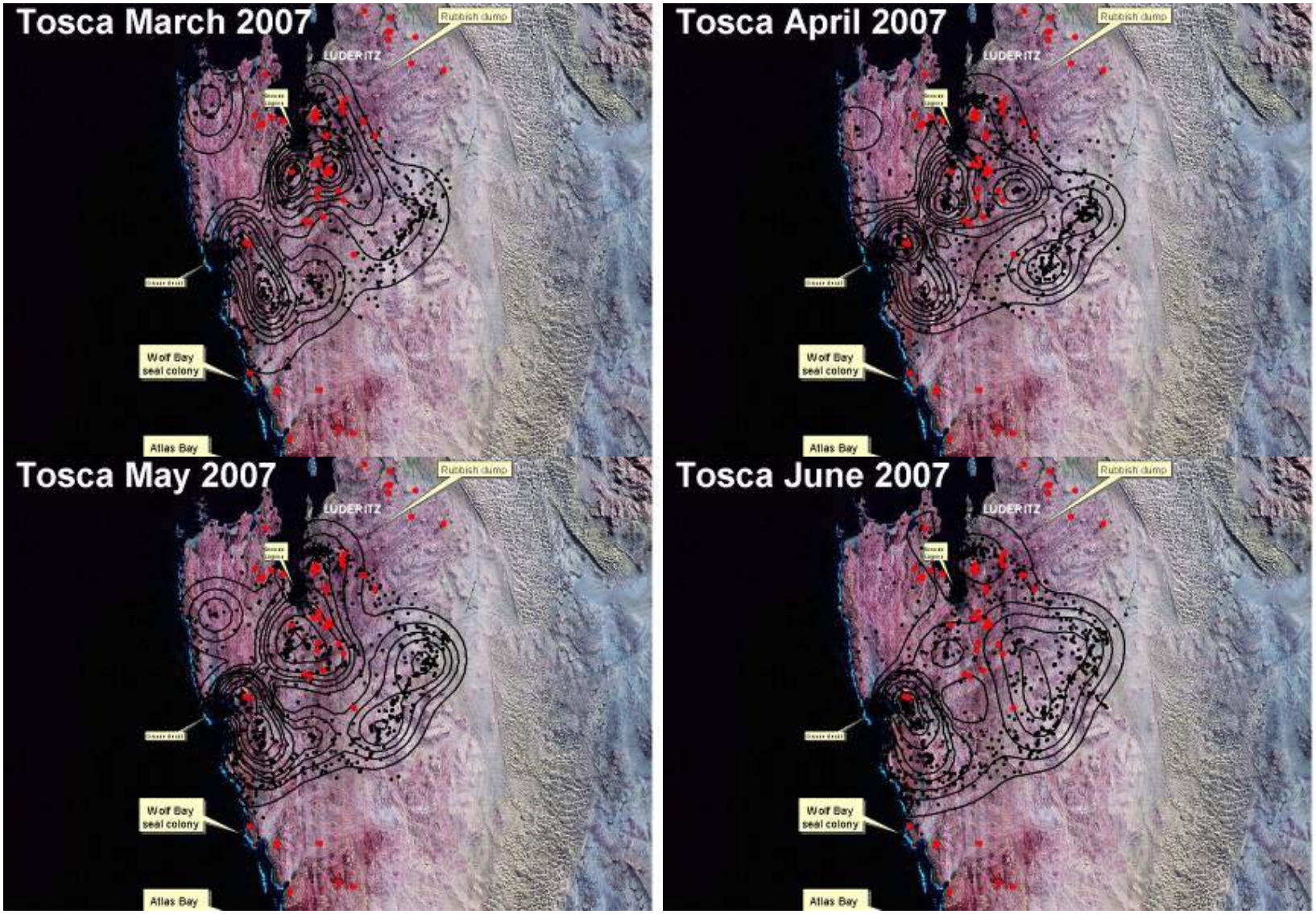


Figure 12: Tosca's home range sizes and changes in there during and after the denning period.

Figure 12 also illustrates Tosca's centres of activity, especially around active den sites:

- July 2006: cubs are approximately four months old. The centre of activity is around Den 1 and 2, which were used during this time.
- August 2006: Den 2 is used.
- September 2006: Den 3 and 3b are used.
- October 2006: Den 4 is used.
- November 2006: Den 5 is used.
- December 2006: Den 5 and Den 6 are used.
- January 2007: Den 6 and Den 7 are used.
- February 2007: Den 6 and Den 7 are used.
- March 2007: Den 5 is used.
- April 2007: Den 5 is used.
- May 2007: Den 5 is used.
- June 2007: none of the dens is used any more. Cubs were fully weaned by this time.

Overall, the denning behaviour of this Sperrgebiet brown hyena female is similar to the ones described for brown hyenas in the Southern Kalahari. Kalahari females visit their 4 to 9 months old cubs 75% of the days. The Sperrgebiet female visited them on average 87% of the days. 10 to 15 months old cubs in the Kalahari are visited by their mother 34% of the days and the Sperrgebiet cubs of the same age were visited on average 37% of the days.

The data set of the second GPS collared lactating brown hyena female will be analysed as soon as possible to compare the Sperrgebiets' females behaviours and to do further comparisons with females in other environments.

HOME RANGE SIZE OF HYENAS IN THE SPERRGEBIET AREA

GPS data is available from 12 brown and one spotted hyenas. Studies take place in three different kinds of habitat within the Sperrgebiet and Namib Naukluft Parks: the coastal area, the area around the town of Luderitz and inland areas. Data for these areas were collected from the following hyenas:

- Coastal area: Dollar, Merlin, Ray, Halenge, Django, Rodin

- Urban area: Gypsy, Minerva, Tosca
- Inland areas: Alfie, Caspar, Maya (brown hyenas) and Oona (spotted hyena)
- Nomadic brown hyena: Floggy

Average home range size differed between hyenas (Figure 13). The spotted hyena “Oona” had the largest monthly home ranges, followed by inland and coastal brown hyenas.

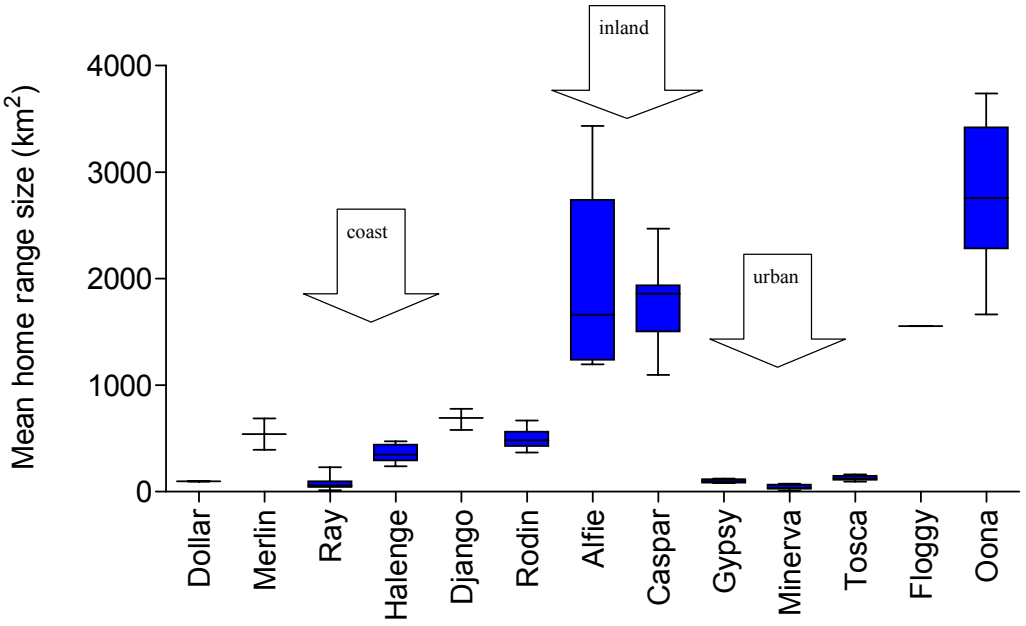


Figure 13: Mean monthly home range sizes in km² of different hyenas.

The three habitats differ in the distribution and availability of food sources:

- Coastal area: localised, all year round food source at mainland Cape fur seal colonies
- Inland area: widely distributed food sources, game migrates with rainfall
- Urban area: localised all year round food source along the coast and in the town of Luderitz

Therefore these three habitats were compared for differences in brown hyena home range sizes (Figure 14). Inland brown hyenas have considerable larger home ranges than coastal and town area hyenas. This confirms that brown hyena home range sizes depend on the distribution of food, as it is the case in the Southern Kalahari.

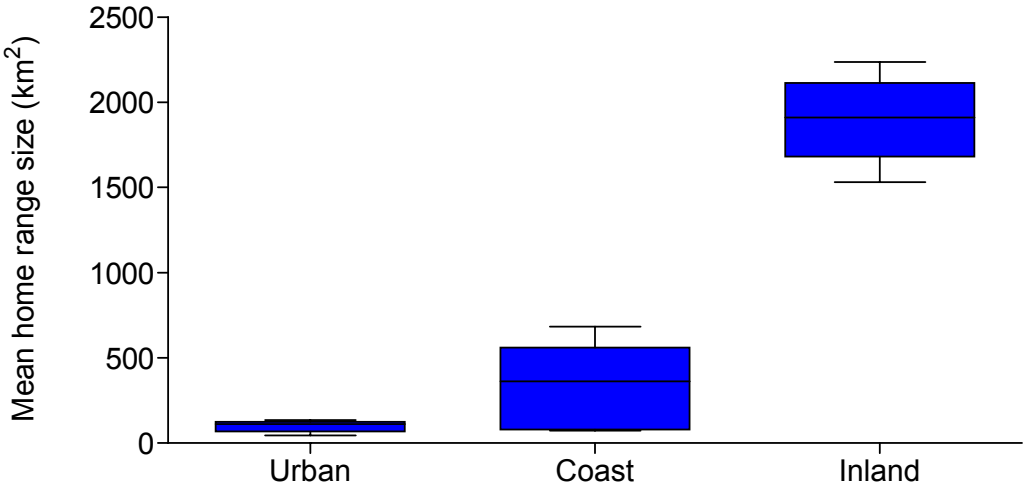
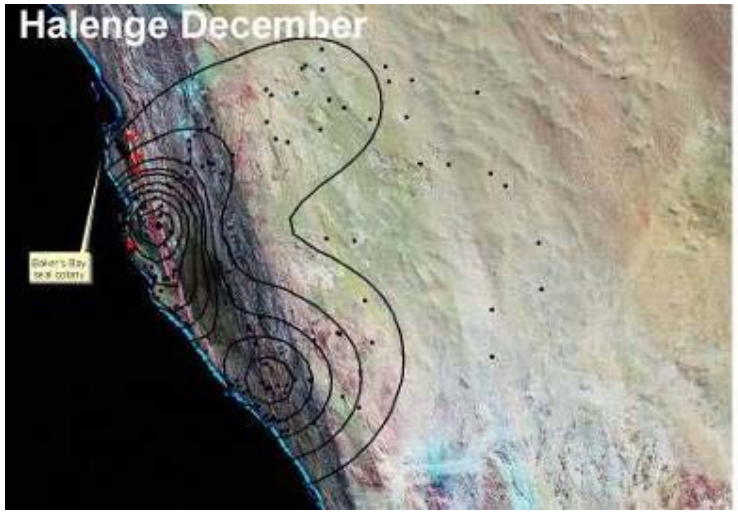


Figure 14: Mean home range sizes in km² of urban, coastal and inland brown hyenas.

The importance of food availability and its seasonal influence can be seen with coastal hyenas. Cape fur seal pups are abundant during the pupping season (November to January each year). In austral winter seal pup availability is lowest. Home ranges of coastal hyenas are smaller and foraging activity is largest along the coast during the pupping season compared to the time of lowest seal pup activity in winter (Figure 15: Halenge).

Other factors also influence the foraging activity and hence the home range size and area. Inland brown hyenas for instance walk far distances to permanent water sources outside the rainy season and home ranges are large. They also use the coastal area as a food source and walk occasionally from their inland home range to the seal colonies to forage (Figure 3: Alfie). During the rainy season, home ranges are smaller and foraging activity shifts to areas with periodic water sources and good grazing habitat, where game accumulates during this time.

Home range size in connection with Cape fur seal pupping season:



Home range size in connection with rainfall (before and after rainfall):

Figure 15: Factors influencing home range sizes

IMPORTANCE OF COAST FOR BROWN HYENAS IN THE SPERRGEBIET AREA

The coastal area of coastal brown hyenas' home ranges remained the most important area, despite the decline in seal pup numbers (see below) and the shift of brown hyena activity to other core areas (Figure 16). Significantly more GPS positions were recorded along the coast and up to 5 km inland than between 5 and 20 km away from the coast. Therefore, brown hyenas spent up to 80% of their time in coastal areas and these areas represent between 6 and 50% of the size of individual brown hyenas' home ranges.

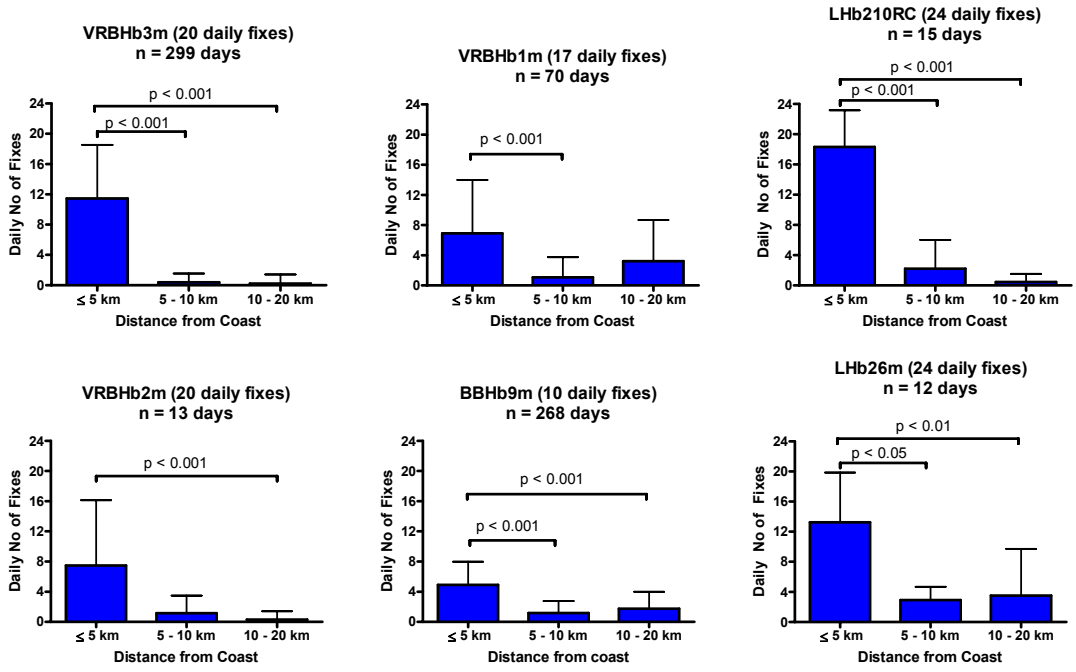


Figure 16: Daily number of GPS locations in areas with different distances from the coast (mean ± SD)

BROWN HYENA MOVEMENT, BEHAVIOUR AND ABUNDANCE, AND IMPLICATIONS FOR THEIR LONG-TERM CONSERVATION WITHIN THE DIAMOND MINING AREA IN THE SOUTHERN COASTAL NAMIB DESERT

In this study we (a) survey home range size, habitat use and activity patterns through GPS telemetry of coastal brown hyenas, (b) determine changes in behaviour through the analysis of GPS data in the area most affected by mining disturbance, and (c) gain spatial information (e.g. about location of core areas). The goal is to provide information about brown hyena behavioural ecology and the sensitive nature of the Cape fur seal-brown hyena predator-prey system to reduce long-term threats and impacts posed by land use.

Two brown hyenas with GPS telemetry collars were monitored around the Bogenfels study site in 2008. VRBHb3m (Ray) died, possibly of natural causes, in May 2008 (see below) and DHb1m (Rodin) is still fitted with a GPS collar.

Several attempts were made this year to collar at least two more brown hyenas in the Bogenfels and Dreimasterbay area.

- 28 February – 2 March 2008: 2 sightings (including one sighting of Ray), no captures
- 7 July – 28 July 2008: 1 sighting of Rodin, no captures
- 8 October – 12 October 2008: 1 sighting, no captures

Compared to the high frequency of brown hyena sightings during darting trips in previous years, it becomes clear that brown hyena abundance decreased significantly in the Bogenfels area during the past year (see below).

BROWN HYENA ABUNDANCE

Brown hyena abundance estimates for the years 2001/2002 and 2003/2004 were 13 and 12 animals respectively. The abundance estimate for the years 2007/2008 was 5 animals.

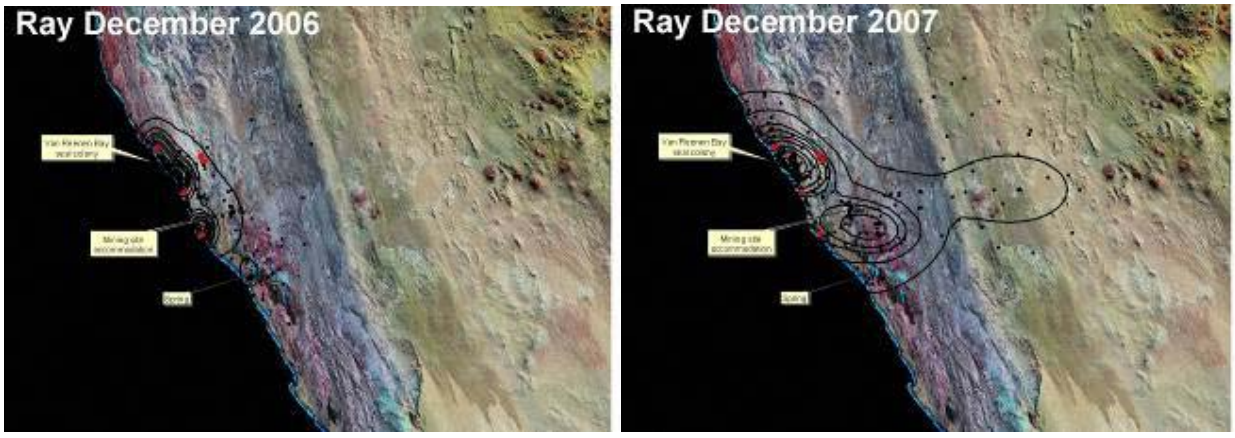


Figure 17: Home range contours of Ray in December 2006 and 2007

GPS data of GPS collared brown hyenas is only available since 2005 and long-term data is only available for one of the brown hyenas (Ray). However, as pointed out in previous reports, home range size and core areas change with different seasons. For instance, home range sizes of

coastal brown hyenas are smaller during the peak of the seal pupping season in December than outside the pupping season in winter. Furthermore, activity core areas during the pupping season are found mainly along the coast and around the seal colonies, whereas activity shifts to additional core areas further inland outside the seal pupping season.

Ray's GPS data show that the above mentioned home range and activity patterns are reflected in the 2006 data set (Figure 17). However, Ray's home range in December 2007 was larger than expected and compared to the previous year, and core areas were found further away from the coast. Brown hyena home range size depends on the distance between meals and brown hyena abundance on food patch richness. The large home range size in December 2007 indicates that there was a change in food availability along the coast and that Ray had to forage additionally in inland areas to meet his metabolic needs.

Seal pup production at the Van Reenen Bay seal colony declined from 1997 to 2005 from 5300 to 2900 pups born respectively (Source: Ministry of Fisheries and Marine Resources, Luderitz). Unfortunately pup production numbers are not available from 2006 on-wards, but the images on the next page demonstrate the further decline in seal numbers. Most seals are present at the seal colony in December with continuously declining numbers towards the beginning of the next pupping season in November. Comparing the image of the seal colony in April 2003 with the image taken in February 2007 it becomes clear that overall less seals were present in 2007. A decline in seal numbers is also visible from December 2005 to December 2007 and extremely low seal attendance was recorded in November 2007 and October 2008.

With the predation pressure from brown hyenas and jackals recorded before 2006, the seal population size at Van Reenen Bay was expected to decline or remain stable, once seal pup production drops below a threshold of about 2000 pups born. This threshold was possibly reached in 2006 and seal pup production became too low to sustain a large population of brown hyenas. Non-violent mortality of seal pups is estimated between 20 and 30% and the remaining pups will die before the start of the next pupping season through predation by brown hyenas and jackals, hence forcing brown hyenas to forage in other parts of their home ranges.

Overall, the decline in brown hyena abundance therefore seems to be attributed to the decline in seal pup production at the Van Reenen Bay seal colony, but further monitoring has to be carried out to confirm this pattern.

April 2003

December 2005

February 2007

November 2007

December 2007

October 2008

BROWN HYENA BEHAVIOUR IN MINING AREA

Up to date there were three issues that were reason for concern:

- Avoidance of Bogenfels beach
- Sewage problem at Bogenfels accommodation site
- Road between Chamais Gate and Bogenfels turn-off

As expected, brown hyena activity along Bogenfels beach decreased. This beach had not been identified as an important foraging beach for brown hyenas, as the Van Reenen Bay seal colony provided enough food in the past for Bogenfels hyenas and the Baker's Bay seal colony still provides enough food for Dreimasterbay hyenas. However, in the past this beach could have been of importance for foraging hyenas to find carrion during times of seal pup shortage. Unfortunately no pre-mining long-term data set is available to evaluate the importance of the beach during times of seal pup shortage before mining commenced.

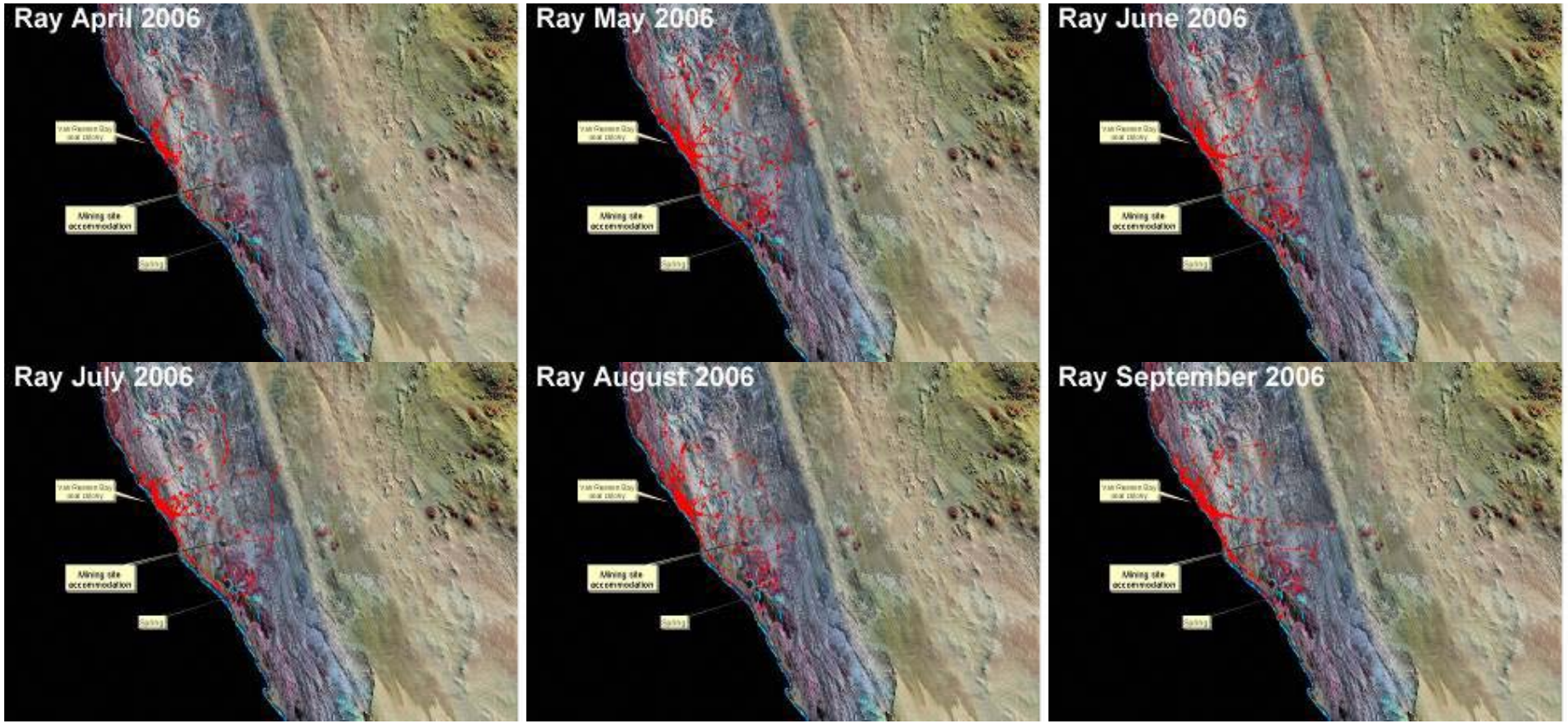
The sewage leak at the Bogenfels accommodation site has been discussed in detail in other progress reports. However, Ray's complete data set was retrieved in June this year and therefore a summary about the identification and mitigation of the problem is given below (compare with Figure 18):

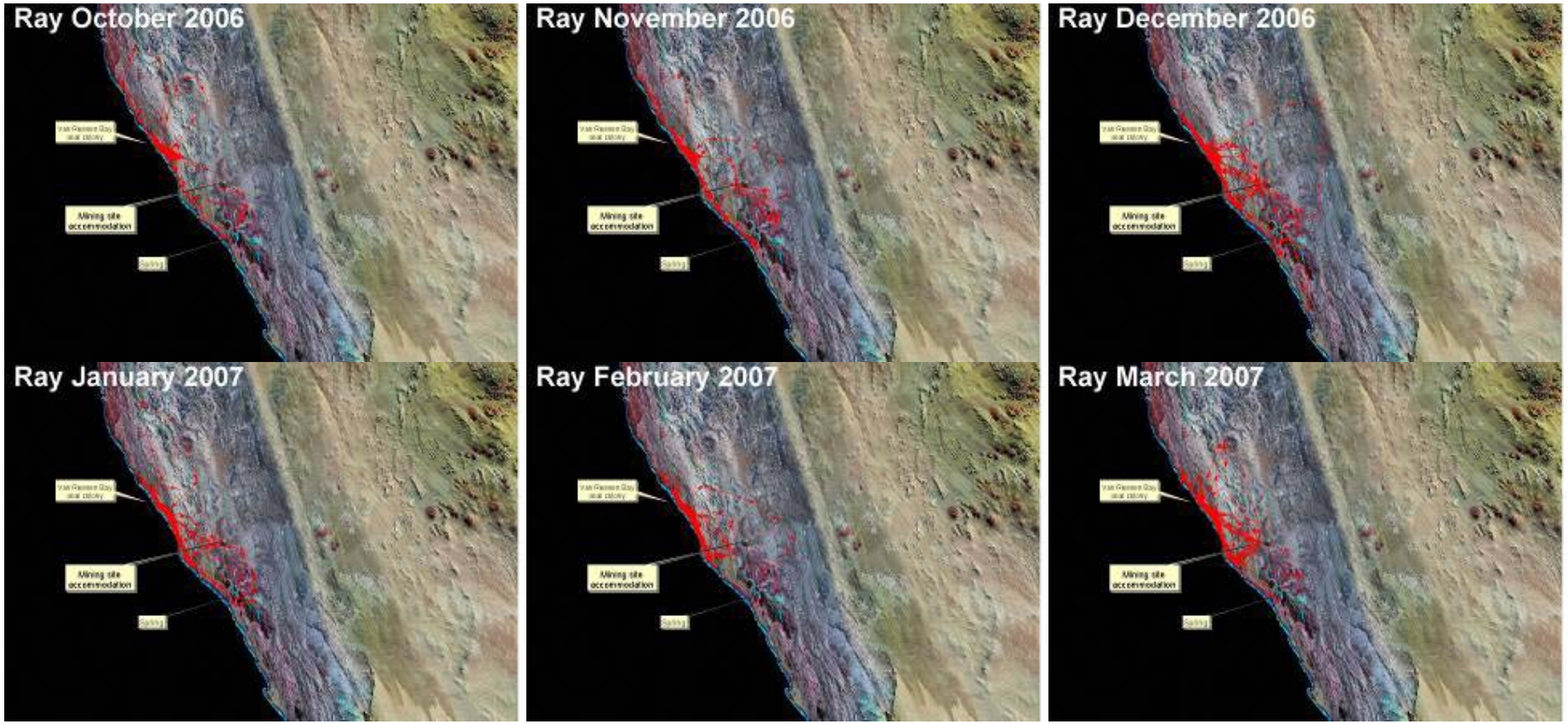
- April 2006 to October 2006: no activity around accommodation site
- November 2006 to January 2007: increase of activity around accommodation site
- February 2007: no activity around accommodation site
- March 2007 to June 2007: increase of activity around accommodation site
- July 2007: no activity around accommodation site
- August 2007 to November 2007: increase of activity around accommodation site, reaching a maximum in December
- December 2007: maximum of activity around accommodation site
- January 2008 to May 2008: decreasing activity around accommodation site
- June 2008: significant amount of activity around accommodation site

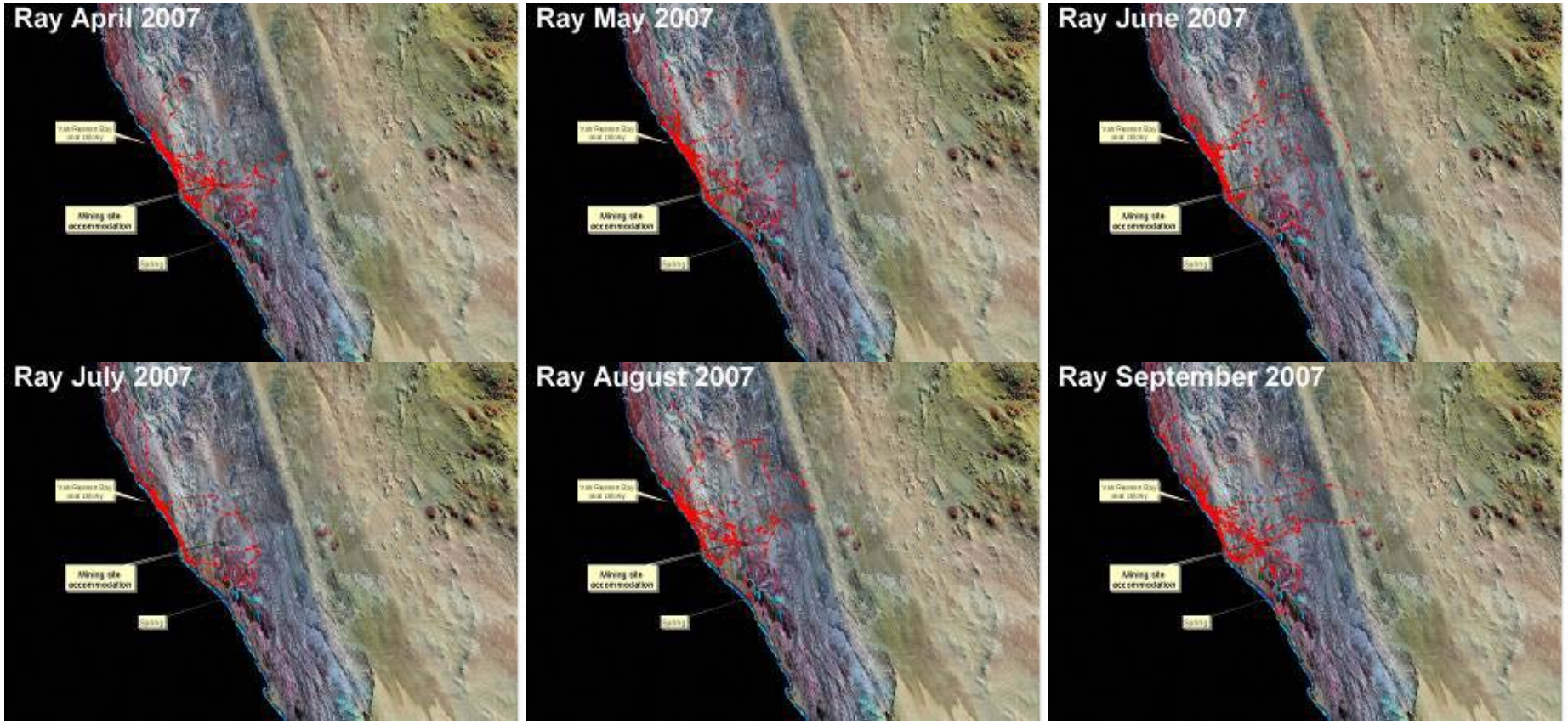
The open sewage system served as a significant water source for brown hyenas, jackals, gulls and crows (camera trap data) from March 2007 onwards. The sewage "lake" was covered in

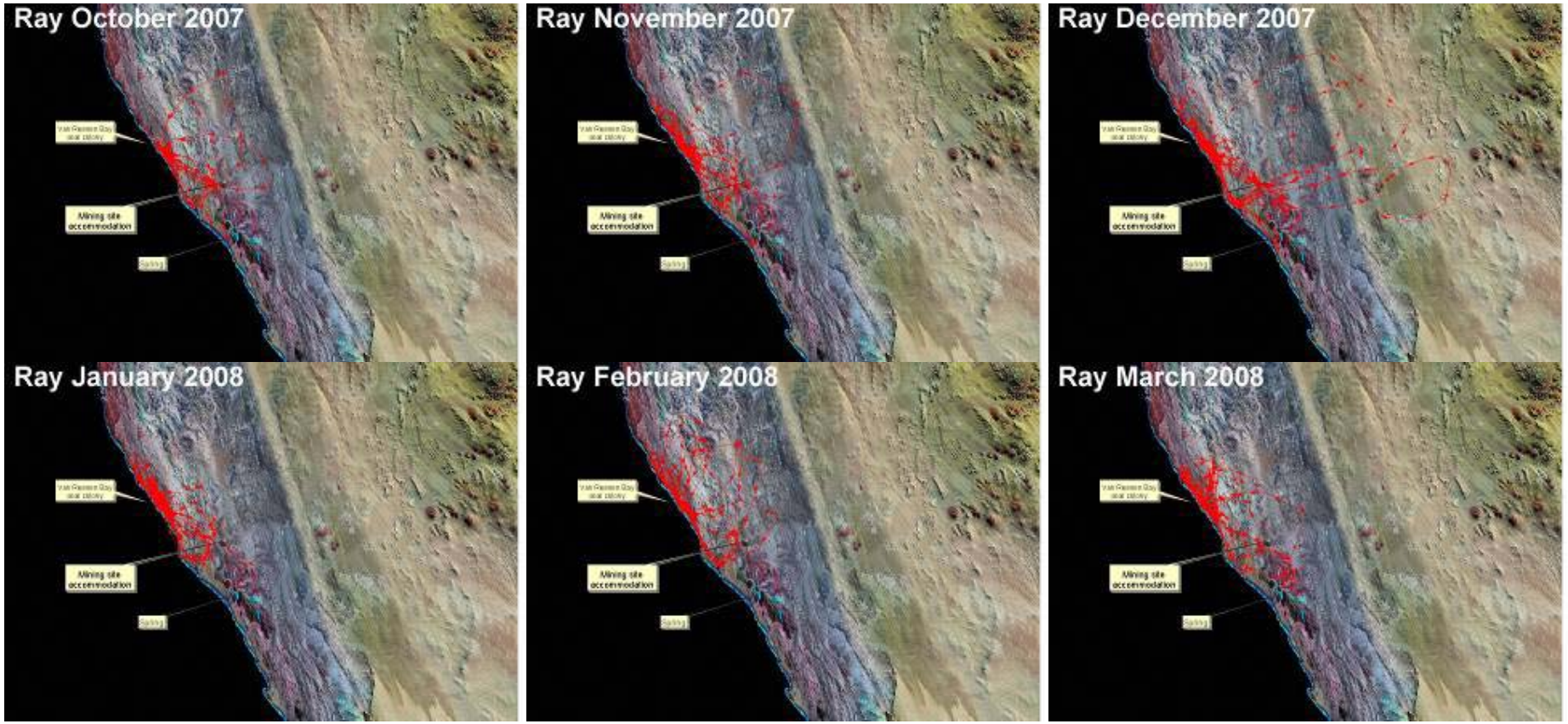
February 2008 and activity around the accommodation site decreased. However, since water was available at the site for a prolonged period of time, the animals got used to the water source and continued searching for water there. It can also not be excluded that the animals find food in the area, as the rubbish area is located right next to the sewage. The increased amount of Ray's activity around the accommodation site in June 2008, shortly before his death, indicates that there is still water available somewhere, as water becomes the most important resource for old and dying animals.

A few hours before his death, Ray apparently "bumped" into a mining vehicle near the accommodation site. It is still unclear whether he got hit and injured or bumped into the vehicle and injured himself, but the skeleton will still be cleaned and checked for injuries resulting from a collision with a vehicle. At this stage, however, it is assumed that Ray died of natural causes.


Ray April 2006
Ray May 2006
Ray June 2006
Ray July 2006
Ray August 2006
Ray September 2006


Ray October 2006
Ray November 2006
Ray December 2006
Ray January 2007
Ray February 2007
Ray March 2007


Ray April 2007
Ray May 2007
Ray June 2007
Ray July 2007
Ray August 2007
Ray September 2007


Ray October 2007
Ray November 2007
Ray December 2007
Ray January 2008
Ray February 2008
Ray March 2008

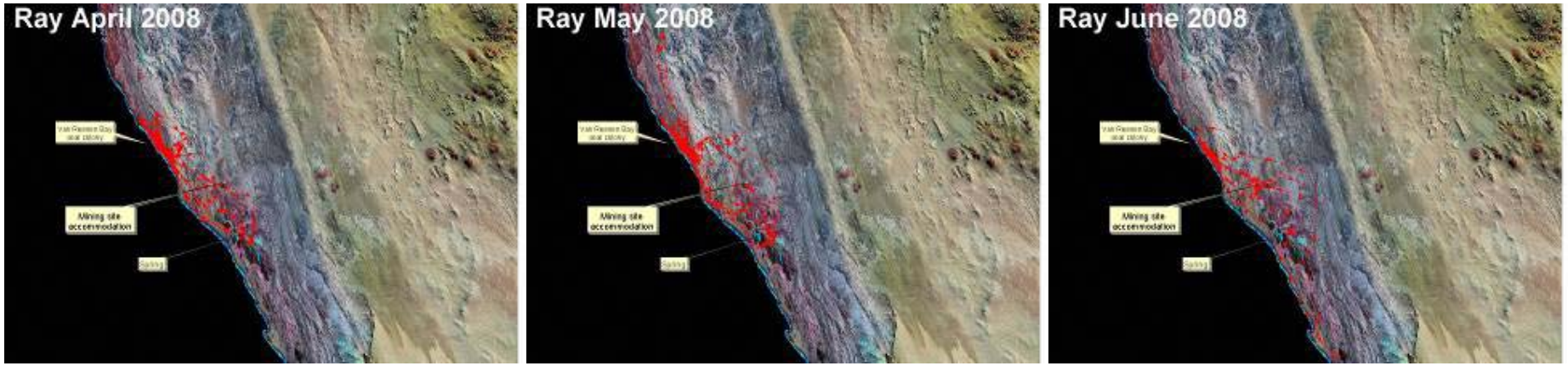
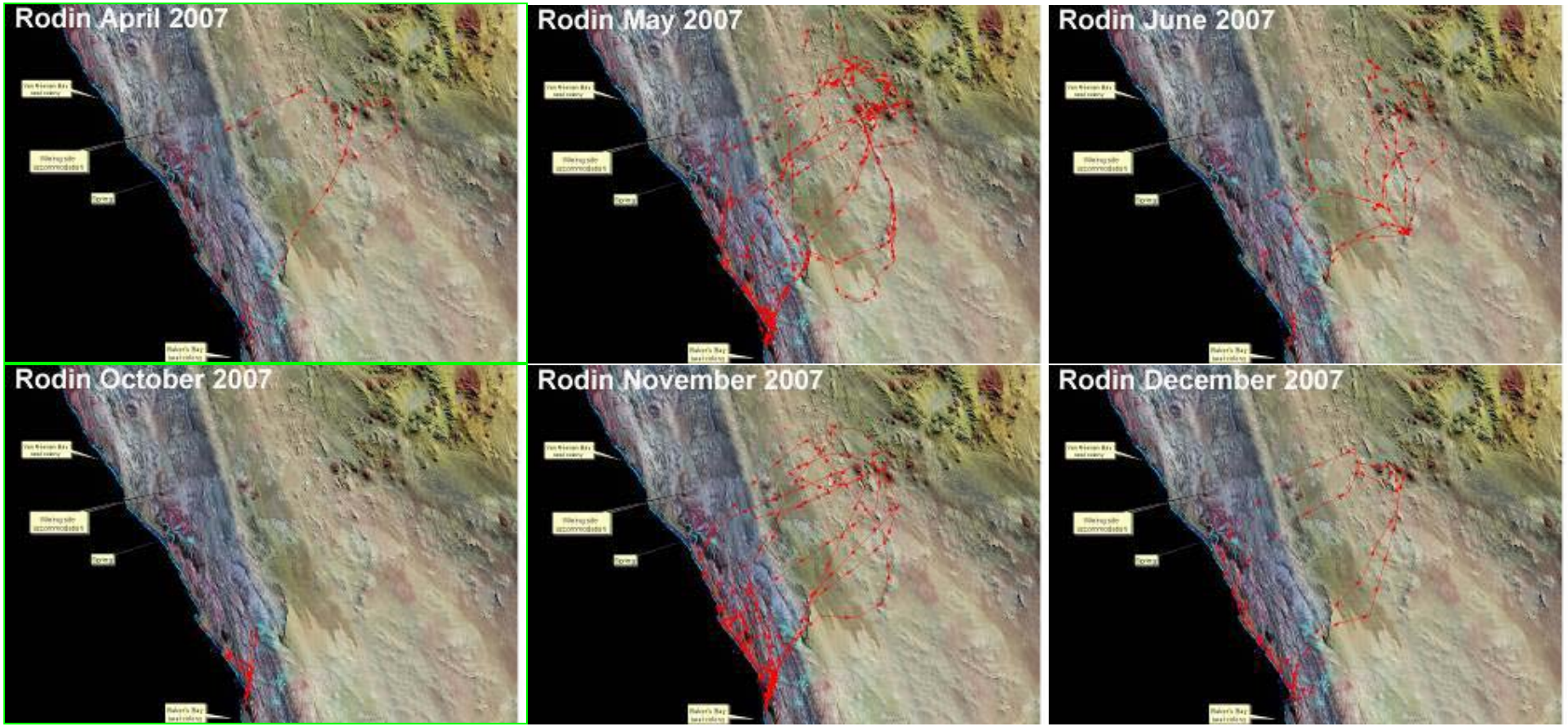


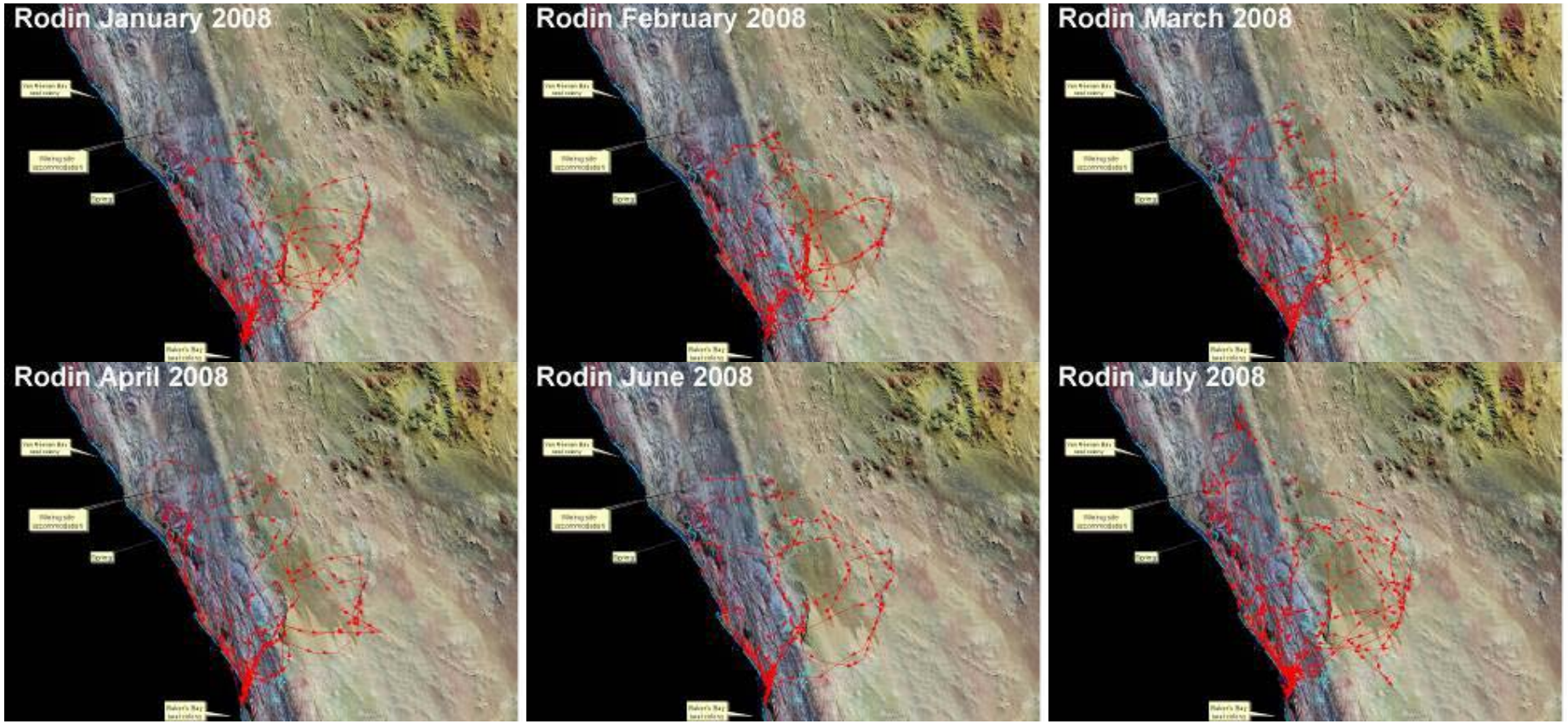
Figure 18: Monthly movement pattern of Ray between 2006 and 2008

Two interesting observations were made while analysing Rodin's GPS data (Figure 19). From May 2008 significant more GPS positions were recorded north of his original territory boundary, which basically means that he increased his movements into the home range of the Bogenfels Clan hyenas. This could correlate with the decrease in brown hyena abundance in the Bogenfels area. If the Bogenfels hyenas' home range becomes vacant, hyenas from Dreimasterbay could shift their territory boundary further north. However, although Rodin uses this new area, he avoids the mining area at Bogenfels beach completely, but discovered the accommodation site as a foraging area. Interestingly, he started visiting the accommodation site in July 2008, around the same time when Ray increased his activity at the accommodation site, too.

A great reason for concern is, that Rodin started patrolling the main road between Baker's Bay and Bogenfels turn-off between February and April 2008 and again from August 2008 on-wards, with a maximum of activity along this stretch of road in October 2008.

The only roadkills reported were of bat-eared foxes along this road. However, Rodin patrolled the road extensively between 13 and 23 August 2008, 23 and 29 September 2008, and 2 to 17 October 2008. The road is not the eastern boundary of his home range and therefore this matter has to be investigated in more detail.


Rodin April 2007
Rodin May 2007
Rodin June 2007
Rodin October 2007
Rodin November 2007
Rodin December 2007


Rodin January 2008
Rodin February 2008
Rodin March 2008
Rodin April 2008
Rodin June 2008
Rodin July 2008

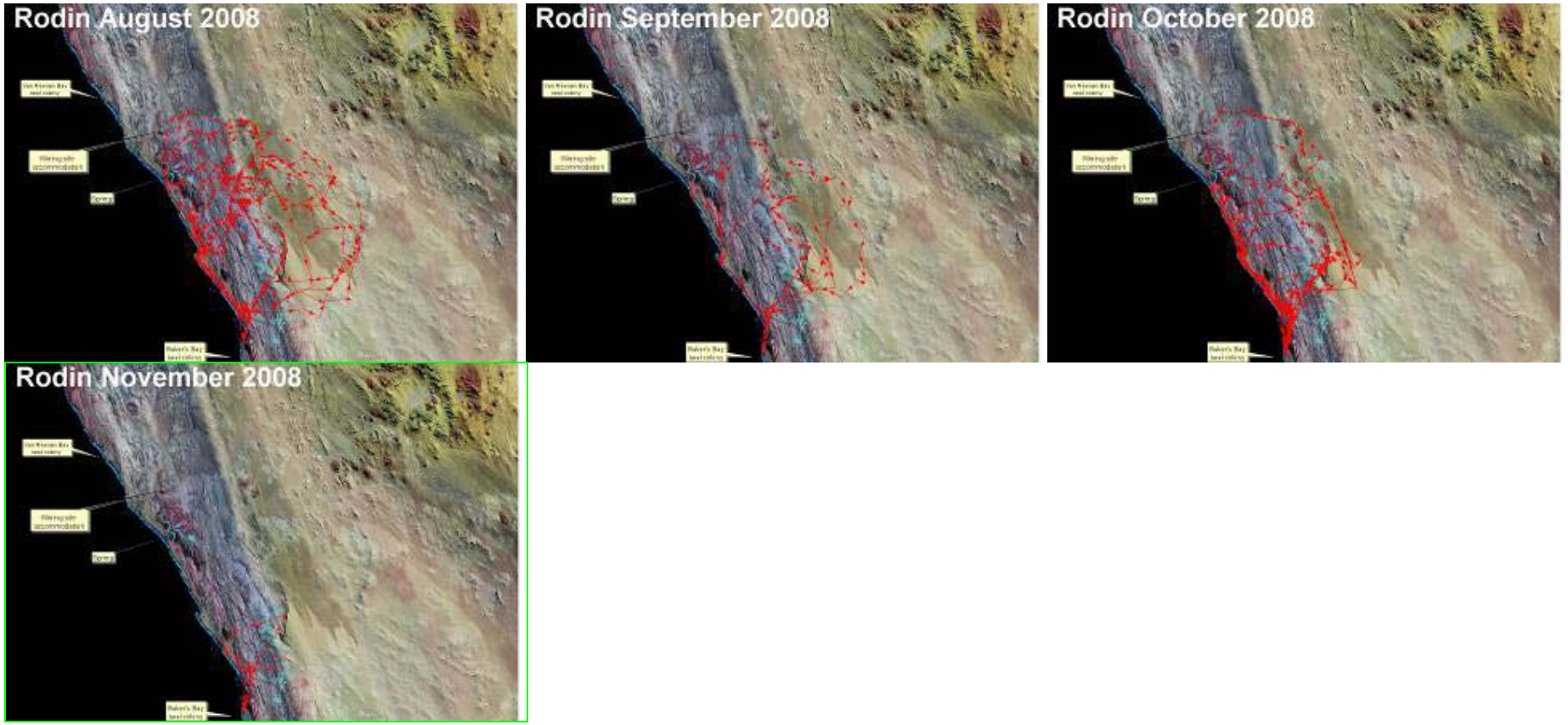


Figure 19: Monthly movement pattern of Rodin between 2007 and 2008 (images with green frames reflect months with less than 100 GPS positions downloaded)

HUMAN WILDLIFE CONFLICT WITH SPOTTED HYENAS AROUND THE SPERRGEBIET BOUNDARY

Spotted hyenas were first reported in the Garub area at the beginning of the 1990s. It is assumed that they migrated into this area from the north, following the game species during a period of extreme drought. Since then, incidental sightings around the mountain Dikwillem and at the water trough at Garub have been recorded and occurrences of spotted hyena roadkills on the tar road between Aus and Luderitz indicate that it is a resident population.

The objectives of the project are to gain detailed data about spotted hyena abundance and distribution, and to evaluate true conflict with humans in the area surrounding the Parks.

The GPS collared spotted hyena “Oona” only occasionally left the Parks and crossed the fences to farmland (Figure 20). She only visited Farm Tsirub to the south of her home range on one occasion in December 2007. Between January and August 2008 she stayed on state land.

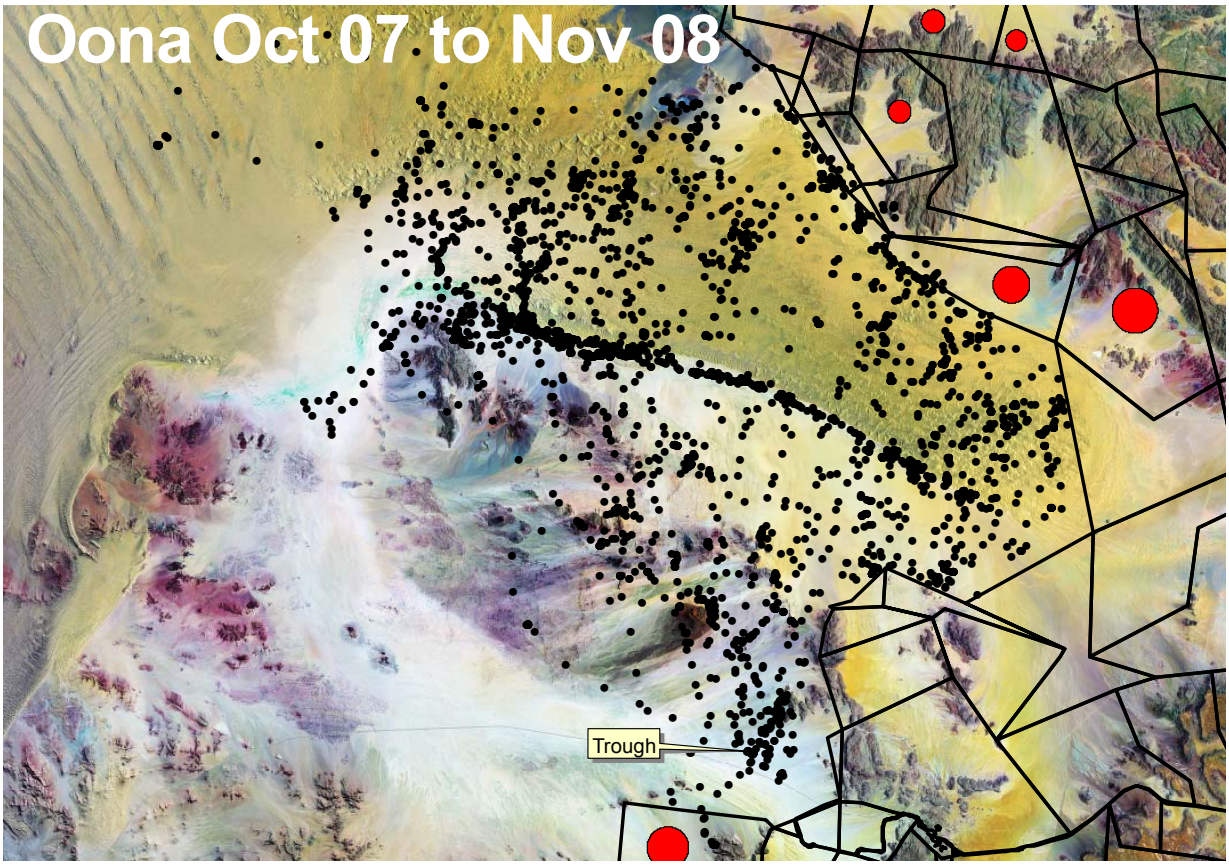
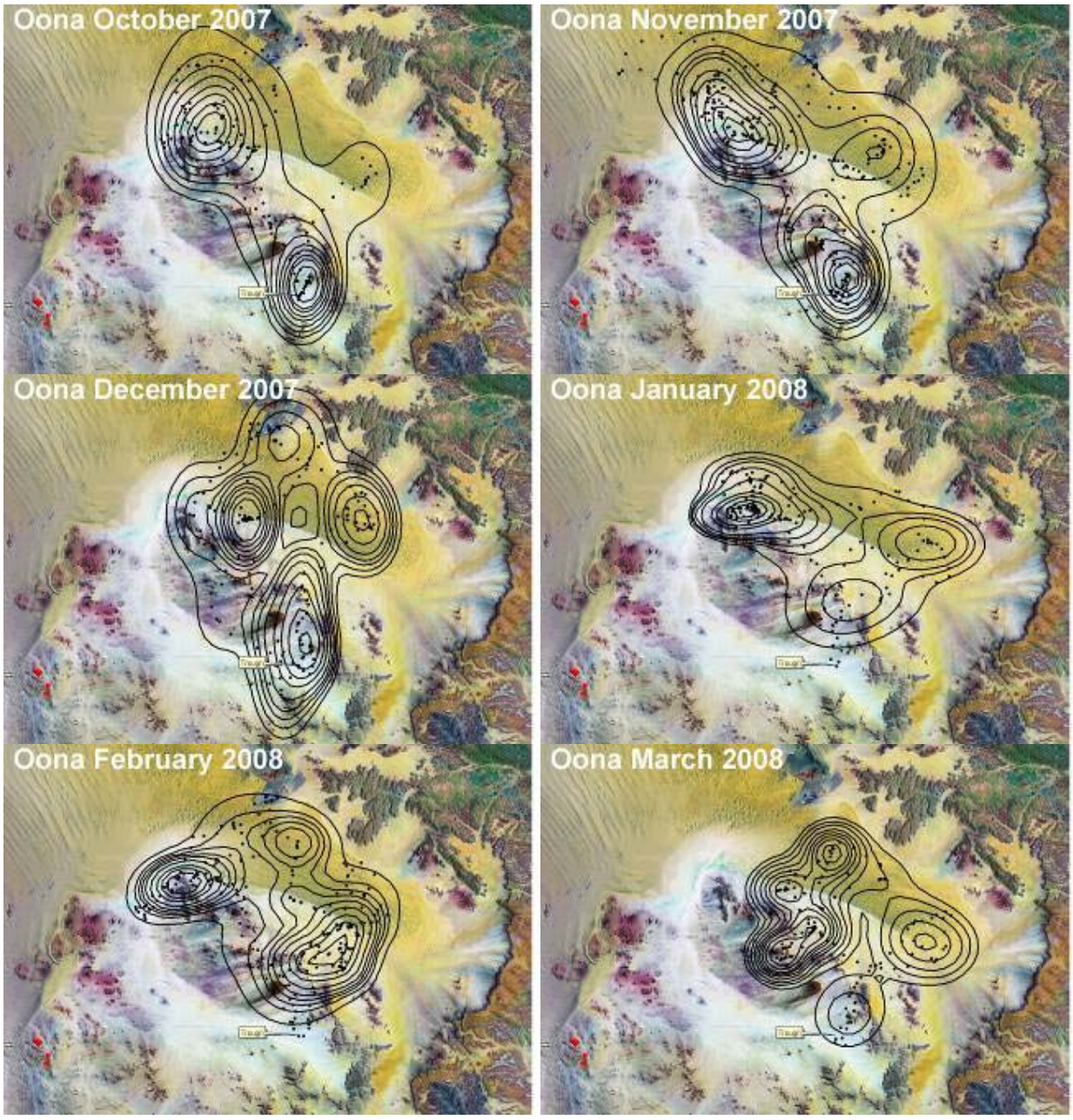


Figure 20: GPS locations of spotted hyena and actual (large red circles: spotted hyenas to be removed if present) and perceived (small red circles) risk to spotted hyenas.

She visited the eastern boundary farms in August and October 2008. Two visits were recorded to Farm 149 (9 and 22 October), one to Farm Numis (22 October) and five to Farm Gunsbewys (28 August, 5 to 7 October and 18 October).

Oona's home range sizes and centres of activity changed over time (Figure 21). The wild horse water trough at Garub initially was one of Oona's centres of activity. However from January onwards, the trough was only visited occasionally and the number of visits decreased over time and stopped completely in September 2008.



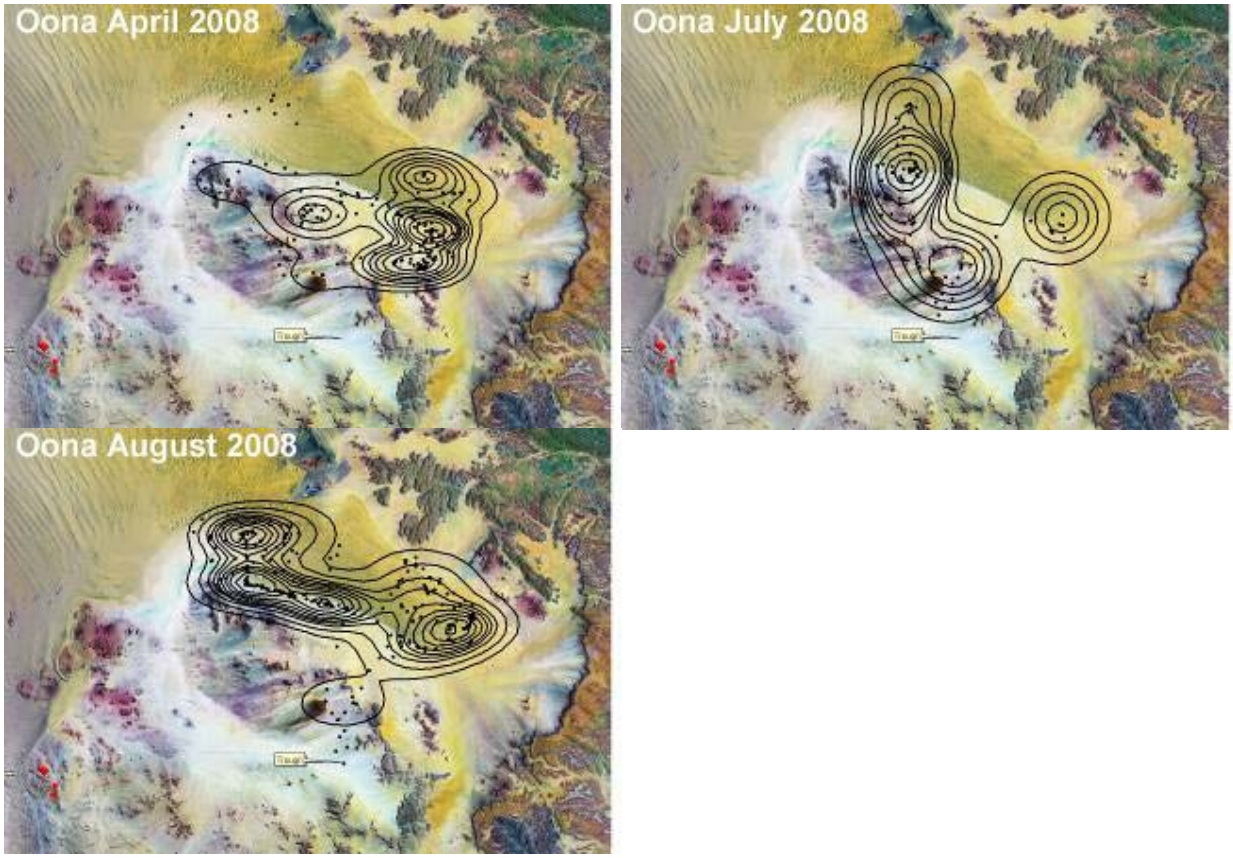


Figure 21: Oona's home ranges and centres of activity over time.

The last data download was done at the beginning of November 2008. Oona's activity between September and November concentrate on the hummock dunes in the Koichab riverbed and the north-eastern boundary fences of the Namib Naukluft Park (Figure 22), where she crossed the fence on several occasions (see above).

So far it is unknown why her home range shifted to areas further north, as there was also food available south of her last recorded movements. However, the wild horse trough was monitored for two weeks in October (due to three wild horse mortalities in the area). During the monitoring, three spotted hyenas visited the water trough on several occasions together. None of the three animals was Oona. These spotted hyenas had also been seen in the area around the mountain Dikwillem to the north-west of the horse trough by tour operators. During our capture operation in October 2007, Oona had also been together with two other spotted hyenas. However, judging the behaviour of the three "new" hyenas at the horse trough, it is unlikely that these were part of the group that was monitored a year earlier. Therefore it is probable, that the three "new" hyenas are part of a different spotted hyena clan, which centre of activity is the mountain

Dikwillem. The presence of another spotted hyena clan in the area may be the reason for the shift in Oona's home range.

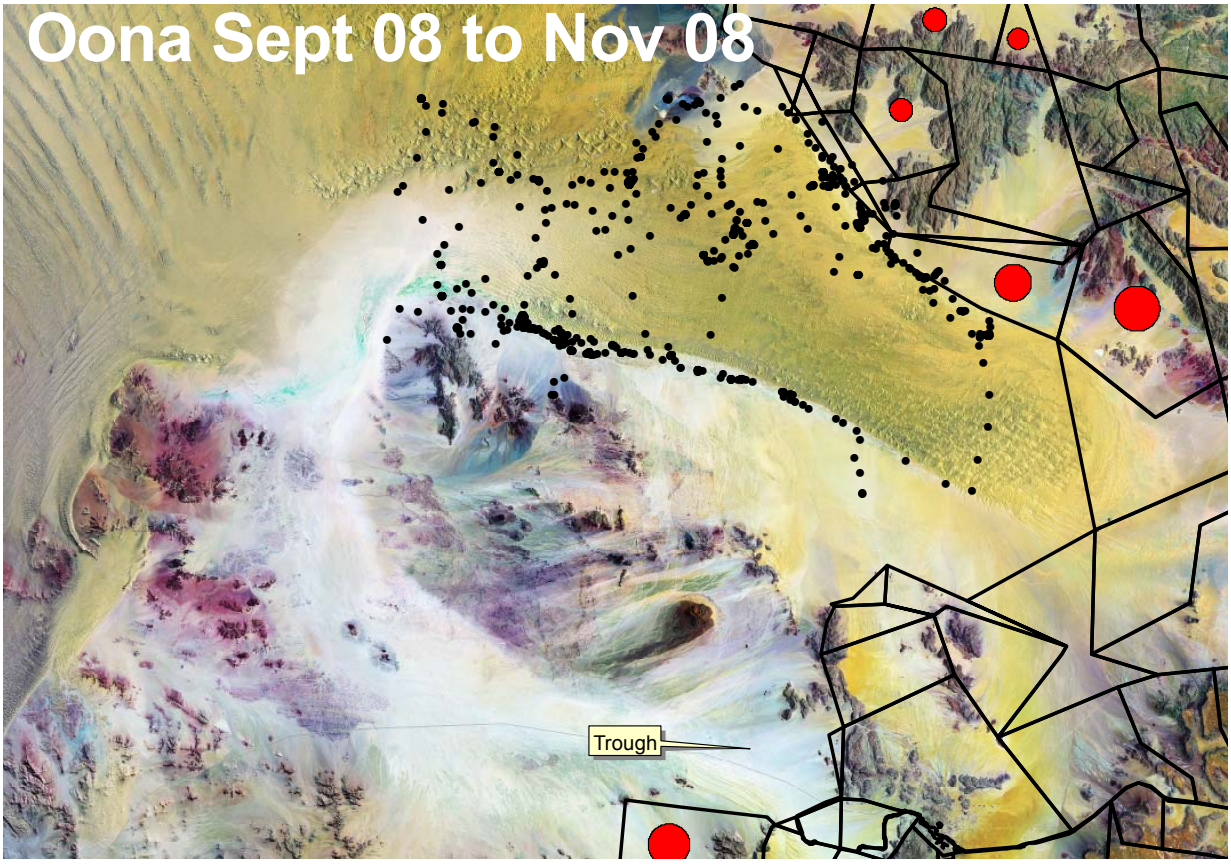


Figure 22: Recorded GPS positions of Oona between September and November 2008.

Another capture operation is planned for the beginning of next year and the BHRP is going to try to collar another spotted hyena of Oona's clan as well as a hyena of the "new" clan.

ENVIRONMENTAL INFORMATION CENTRE

The Environmental Information Centre is situated at Kolmanskop Ghost Town. Tourists visiting the Ghost Town are our main visitors, but the Centre is also the base for our environmental education project. Students from Luderitz schools visit the Centre and learn about the general behaviour and ecology of carnivores, followed by a field trip to the Luderitz Peninsula.

COLLABORATIONS

Namibian Biodiversity Programme

The Brown Hyena Research Project records direct observations of biogeospatial data on carnivores and other taxa found within the brown hyena study area of Sperrgebiet and reports these to the Namibian Biodiversity Database.

Queens University, Canada

Genetic analysis of our samples is done in collaboration with the Queens University in Canada. Blood and tissue samples have been exported with valid export and import permits. A paper publishing the results has been submitted.

University of Pretoria

We collaborated with Dr. Brian Kuhn. The title of his project was: A palaeozoological and ecological approach to the collection behaviour and taphonomic signatures of hyaenas. The results have been published in “Transactions of the Royal South African Society”.

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- Namibia Environment Fund
- Wilderness Safaris Wildlife Trust