O V E R V I E W

Year-end report January – December 2011`

Cheetah Conservation and Human Impact in Kenya

Photos: Left to right-Cheetahs in Samburu; Cheetah track; Meibae rangers with Chris Lentaam (center) and Cosmas Wambua (right), Collared cheetah and cub in Samburu (photo by Peter Barber).

SUMMARY

Action for Cheetahs in Kenya (ACK) mission:*To promote the conservation of cheetahs through research, awareness and community participation in Kenya.*

The cheetah (*Acinonyx jubatus*) is classified as vulnerable (Durant, Marker et al. 2008). Recent estimates show that Kenya holds 1200-1400 cheetahs with over 75% residing outside protected areas (Wykstra, *in press*). Cheetahs have been extirpated from 25% of their historic Kenyan range in the last 20 years (KWS 2010). The goal of this project is to promote cheetah population sustainability in Kenya through coexistence with people. The objectives are to: 1) identify factors affecting cheetah livestock predation and mitigate conflict; 2) understand cheetah habitat selection and 3) influence public and administrative changes to positively affect cheetah conservation and management protocols.

ACK works closely with local wildlife authorities and land holders to develop policies and programmes which support wildlife conservation and human livelihoods for the long-term development of sustainable human and wildlife zones. The project receives technical and financial support from the Cheetah Conservation Fund (CCF) and works in affiliation with the Kenya Wildlife Service (KWS). ACK links with other large carnivore programmes through ***Carnivores, Livelihoods and Landscapes (CaLL)***, a Kenya non-profit organization. The project is focused in two regions (Salama and Samburu) which are identified as a high priority in the

National Cheetah and Wild Dog Strategic Plan (Anonymous 2007)and follows methods recommended by the Global Cheetah Master Plan.

Research in 2011 focused on three areas: 1) analysis of monitoring and cheetah movement data from 2007 to 2011 collected in the Salama region; 2) analysis of the relationship between cheetah and human influences throughout Kenya and 3) initial data collection for habitat monitoring in the Meibae region of the Samburu District. Results identify factors influencing cheetah habitat selection and issues affecting livestock predation to allow ACK to conduct seminars and training for community members and wildlife managers. This information assists in problem animal-control measures to prevent the killing of cheetahs and promotes ecological awareness through community education and school programmes.

I. ACCOMPLISHMENTS

The list of accomplishments from January – December 2011 includes:

RESEARCH

- Salama – data was collected by research staff, community scouts and volunteers.
  - Research staff conducted 60 driving line transects; data was entered and analysed;
  - Cheetah scouts conducted 36 walking point transects to record predator footprints and game sightings; data was entered and analysis is underway;
  - 171 conflicts were brought to the attention of Salama field officers, including 15 cases of injured livestock, 28 lost livestock (no cause), three mortalities due to disease and 17 cases of stolen livestock. There were 107 documented fatal livestock incidents. All interview data from farmers conducted between 2007 and 2011 was compiled for statistical analysis.
- Samburu – data was collected in collaboration with the Meibae Conservancy rangers.
  - Walking transects conducted on 240 days resulted in a distribution map of carnivores and prey base;
  - An area map was overlaid with man-made features (roads, boundaries, towns and geographical markers) to assist in the long-term cheetah research.
- The Samburu National Reserve inactive GSM collar was removed - the data was retrieved and cause of failure identified.
- Mary (ACK Director) worked with Yale University Forestry and Environmental Studies advisors to prepare a publication on the factors influencing cheetah presence throughout Kenya.
- ACK linked with the Athi-Kapiti conservation researchers to extend studies from Mukaa into the Machakos and Kajiado districts to gain a clearer perspective on the relationship of cheetahs along the corridor between the greater Nairobi through to the Amboseli environs.
- Students were identified to conduct camera trapping and faecal studies.

COMMUNITY DEVELOPMENT, EDUCATION AND AWARENESS

- Cheetah scouts in Salama assisted 52 farmers/herders in finding missing livestock. In 28 cases all livestock were recovered, three cases discovered dead, and 21 cases had no recovered livestock. Cases of theft reports were filed with the proper authorities;
- Salama scouts assisted 20 farmers in improving boma (livestock corral) construction;
- Two community meetings(baraza) were conducted in Salama to share information on livestock loss prevention;
- Participants from the Cattle Dip and Bee Keeping in Salama were monitored to follow their success in managing successful businesses that are a model to other farmers;
- Two presentations were given at the annual KWS carnivore workshop in Nairobi to share ACK's achievements with the carnivore researchers working in Kenya in July;
- Presentations were given at conferences and zoos in the US to highlight research and community efforts in cheetah conservation in August through October;
- Three tourist talks were given at the Salama Research Camp.

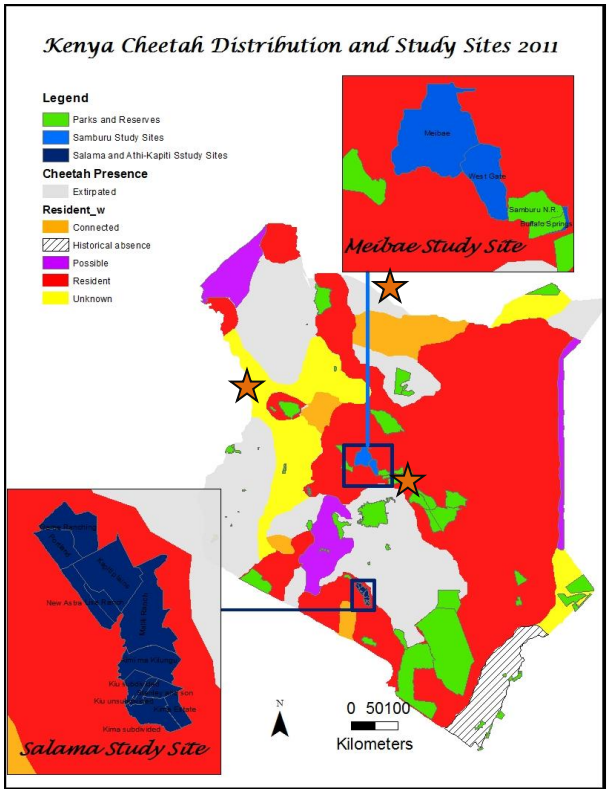

Figure 1: ACK Salama and Meibae study sites are located in northern and south eastern Kenya. Affiliated projects (orange stars) are also working with KWS in the Massai Mara, Meru and Tsavo ecosystems (Mara-Meru Cheetah Project and Tsavo Cheetah Project).

II. RESEARCH AND EDUCATION ACTIVITIES

A. ECOSYSTEM AND PREDATOR CONFLICT RESEARCH

1. National Cheetah Survey

Road, settlement, water and protected area were used to model the relationship of the presence of cheetahs to human influences. Over 9000 data points recorded in the three-year study also included the presence of livestock, prey and other predators. Additional interview and KWS occurrence/conflict report data added another 1500 points into the data being analysed. Preliminary evaluations show that our survey covered 3,259 km of road - nearly 30% of the country (221,000 sq km) and 75% of historic cheetah range.

Additionally, 75% of blocks containing an indication of cheetah presence were outside of National Parks and Reserves. Roads were present in 80% of the blocks containing cheetahs. Water had a low significance in predicting cheetah presence and 54% of settlements containing less than 5000 people had cheetahs present within a 2km radius of the manyatta, homestead or village (Wykstra, *in press*)

Photo: Salama cheetah team – Mark Mutua (housekeeping), Cosmas Wambua (Senior Scientist), Lumumba Mutiso (Community Liaison), Mary Wykstra (Director), Jimmy Kitange (Cheetah Scout), Pius Mutila (Cheetah Scout),

2. Ecosystem Monitoring

Throughout Kenya, increasing human population and landscape disturbance have a detrimental impact on wildlife habitats. ACK continues to document the effects of subdivision in the Salama study site through mapping of settlements and accompanying activities, evaluating changes in prey and providing an opportunity to identify patterns of cheetah movement in relationship to livestock losses. The distribution of game across the Salama region indicates adaptations to the varied types of land use, especially in the time of day when cheetahs are active. Transects were completed in December 2010, and data was entered and analysed in 2011.

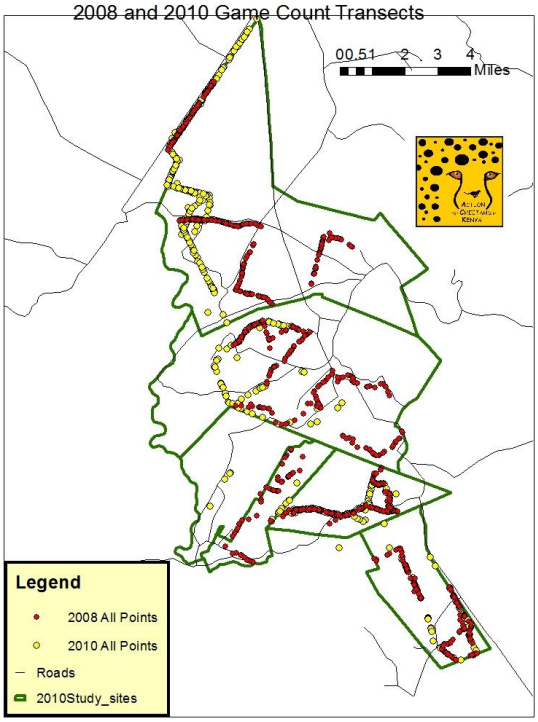

Figure 2: Line transects in 2008 and 2010. In 2008 several short transects were laid out, but in 2010 they were combined to longer transects due to changes in roads and objectives.

The purpose of the 2010 line transect counts was to compare density, abundance and distribution of game and other species encountered to the counts conducted in 2008 (Figure 2). The ability to evaluate actual trends relies on data collected over a greater time frame. Changes in density and abundance were seen in nearly all species encountered. However, there was little change in the distribution of the game species across the ranches. This was surprising to us considering that there are areas of greater settlement where we expected a declined distribution as well as density and abundance. It is not possible to test the significance of the decline using only two sets of data, thus line transect counts will be conducted again on these ranches in 2012.

Preferred Cheetah Prey (PCP) as categorised (Hayward, Hofmeyr et al. 2006) by Cosmas in his master's thesis showed greater decline in the smaller species and an increase in the larger species (Table 1). Of greatest concern is the cape hare and dikdik decline because our current evidence showed a greater dependency on these species for cheetahs in this region. While cultivation and settlement could account for reduced ability to see these species, the Distance programme used in achieving these numbers is known to be an accurate means of estimation for both density and abundance. The minimum estimate in our analysis assumes all animals along an 800 meter wide transects are seen. The likely estimate corrects for detection using Effective Strip Width (ESW).

Table 1: Preferred cheetah prey (PCP) shows decline in the smaller game but increase in larger game.

Species	**Density/ km^2**		**Abundance**	
	2008	2010	2008	2010
Cape hare	47.031	17.753	11687	4412
Dikdik	8.6996	6.1192	2162	1521
Duiker	14.047	8.3924	3491	2086
Grants gazelle	1.0868	4.7175	270	1172
Impala	1.0557	2.7987	262	695
Steinbuck	9.8096	6.0867	2438	1513
Thomson's gazelle	6.6758	8.2847	1659	2059

For the species categorised as Sometimes Cheetah Prey (SCP), there was an increase in both density and abundance for most species (Table 2). These tend to be the species that raid crops, and thus could be coming closer to the new settlement for the crops. They are also the species that would take cover in the bushland areas where settlement has been the most intense since the subdivision and therefore are being driven into the more open areas.

Table 2: Sometimes cheetah prey (SCP) species show increase or stability except in game birds.

Species	**Density / km^2**		**Abundance**	
	2008	2010	2008	2010
Guinea fowl	8.931	7.6799	2219	1908
Kongoni	6.1268	10.589	1523	2631
Spring hare	15.139	16.768	3762	4167
Vervet monkey	1.7827	1.755	443	436
Warthog	0.9084		23	
Wildebeest	0.5695	3.145	142	782
Yellow-necked spurfowl	7.3048	5.7443	1815	1427
Zebra	0.42095	2.3412	105	582

Very few of the game animals categorised as Seldom or Never Cheetah Prey (SNCP) were found on the ranches outside of Kapiti during the 2008 counts. The Kapiti Plains ranch was included in 2008 as a control area and was not included in 2010 counts because it is out of our primary study area. Of the species rated in this category aardvark, bat-eared fox, jackal and spotted hyena were the only species seen often enough to run the Distance program for density and abundance form the primary study ranches (Table 3). Other species such as African wild cat, baboon, buffalo, civet cat, eland, giraffe, porcupine, serval and stripped hyena were seen only once or twice in 2008 and not seen at all in 2010. One species, the bush pig was seen once in 2010 but not at all in 2008.

Table 3: Seldom/never cheetah prey (SNCP), including predators shows decline in all species except the jackal.

Species	Density/ km^2		Abundance	
	2008	2010	2008	2010
Aardvark	0.522		130	
Bat-eared fox	0.56847	0.3703	141	92
Jackal	1.682	2.7205	418	676
Spotted hyena	0.5131	0.62162	128	154

The distribution of the game species in 2010 is similar to the 2008 counts with the greatest change of prey being the reedbuck and the yellow-necked spur fowl and the greatest change in predator being the jackal. Still PCP and SCP were well distributed across the study area (figures 2 and 3) in both counts. Thus the greatest concern for the future of the cheetahs in this area is the drastic decline in abundance for most of the preferred prey species. Also of concern is the increase in jackal density and distribution (figure 4) both as a problem animal and as a kleptoparasite of cheetah kills.

Figure 3: Distribution of Preferred Cheetah Prey extends across all farms in 2008 and 2010. The reedbuck was not sighted on several counts in 2008 but not at all in 2010.

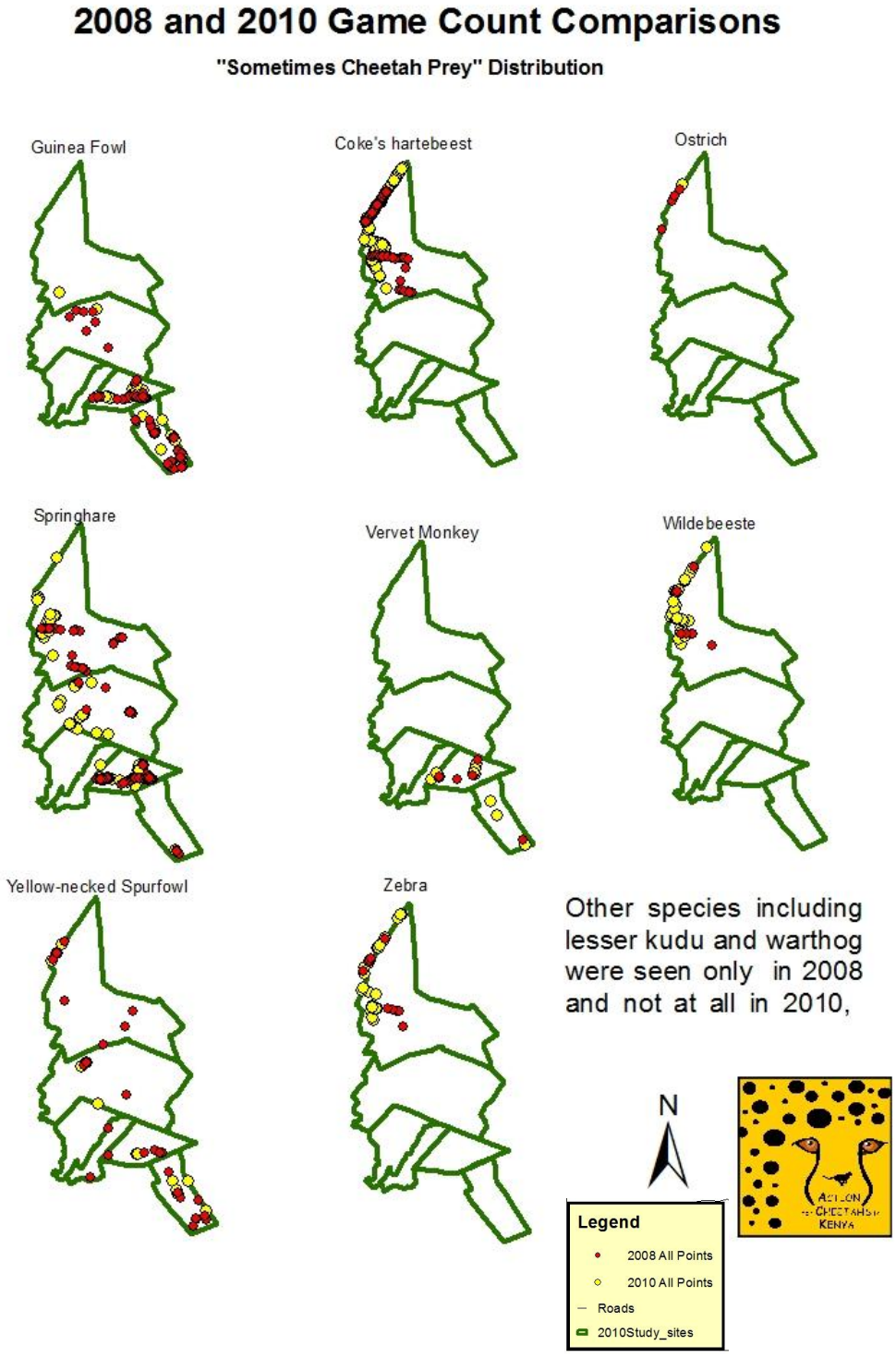

Figure 4: Distribution of Sometimes Cheetah Prey (SCP) also extends across all farms in 2008 and 2010. The yellow-necked spur fowl was not sighted more frequently in 2010.

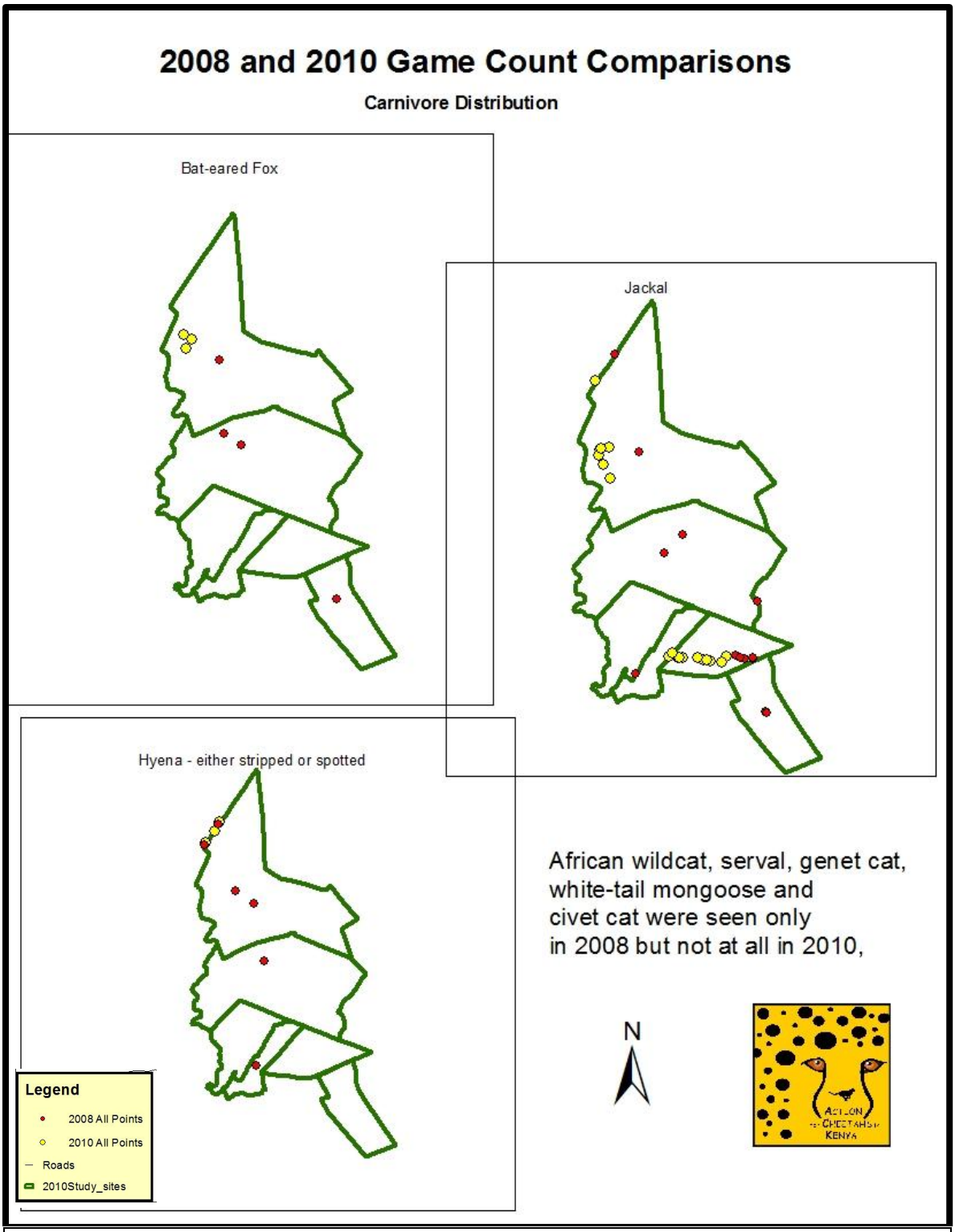

Figure 5: Carnivores were rarely sighted on game counts, but the jackal was condensed into two areas in 2010. Hyena sightings during game counts were also limited to the northern boundary near the border with the commercial farm of Kapiti Plains.

Other species such as caracal are recorded on walking point transects via spoor, but have never been encountered during driving transects. We are certain of the presence of the caracal because of camera trap tests in the area, but the density cannot be estimated until a full camera trapping study is completed in 2012. Walking point transects were conducted from January through November 2011. This data is currently under analysis and will be presented in the coming year (2012) in correspondence to camera trapping studies. The number of settled plots in the area has increased and new roads and fences make consistency in permanent transects a challenge. Our line transects will be evaluated and settlement patterns will be mapped for further analysis of the effects of land-use change on the distribution of cheetahs in the Mukaa district.

The Community "Cheetah Scouts" are visible members of the staff operating daily in cheetah-range areas within our two study sites (Salama and Samburu). In addition to collecting data on cheetah sightings and tracks, the scouts distribute information about cheetah behaviour and the reasons for livestock losses. The Scouts also prevent greater losses by helping to quickly find lost livestock reported to them. Scouts visit cheetah conflict sites within 24-hours of a report to determine events leading up to the loss, assisting farmers with conflict mitigation -- especially improvement of livestock bomas. Sightings, predator tracks, and conflict reports are entered into a database to evaluate cheetah movements and to map conflicts onto identified cheetah ranges and human settlements.

Photos: Salama cheetah scout Pius Mutila conducts interview and uses laminated cards to identify the predator that invaded the boma.

Fifty-six conflict incidents were attended to, of which, four interviews verified livestock lost could be attributed to cheetah. The largest number of incidences (34) was due to hyena, nine to leopard and in 11 cases there was not enough evidence to identify the responsible culprit. On one occasion, evidence showed a domestic dog to be the culprit of a sheep's death. Conflicts with jackals are seldom reported to our officers, but with the evidence of increased jackal numbers and a decrease in hares and dikdiks, we are concerned that jackals may become a problem in the areas.

The highway continues to be a large threat to predators in the Salama area. In 2011 there were eight predator mortalities (2 cheetah, 3 hyena, 1 python and 2 serval) – one serval was killed by domestic dogs and all others, including both cheetahs, were hit by vehicles on the Mombasa Highway (the python was hit on Ulu Road). One juvenile cheetah was killed by a vehicle about 10km north of the study area boundary along the Mombasa highway, another was seen successfully crossing the highway in the late afternoon in August about 25km north of our study area by Cosmas Wambua (Senior Scientist). The newly constructed Mombasa Highway has steep hills in this area. Lories (trucks) travel at high speeds coming down the hills and slow down below 20km/hr travelling up the hill. Illegal passing and impatience occurs regularly, threatening the lives of people, livestock and wildlife. There are no designated crossing areas for livestock along this busy stretch of highway and speed bumps would only prevent many lories from ever reaching the top of the next hill. KWS and ACK are seeking partners to lobby for tests in highway under and/or overpasses along this and other dangerous roads.

Our scout programme is being expanded into the Samburu district through affiliation with the Meibae Conservancy. Chris Lentaam trained with ACK and collected wildlife distribution data with the Meibae rangers throughout 2011. Cheetahs were sighted on 16 occasions and their tracks were found on 42 occasions. The Samburu area has threats (elephant, buffalo and lion) that limit the ability for a lone individual to conduct walking transects, thus our scout walked with armed rangers and accompanied them in their routine movements. During this year we were able to learn where there are gaps in current data collection. Using the coverage from 2011 counts we have determined the number of additional scouts needed and the types of data to collect in this area.

3. Cheetah Movements

The Salama and Athi-Kapiti region is a corridor between the Nairobi National Park and the Amboseli National Park, and a dispersal area for game and predators. Movements of cheetahs across this area form an essential connection for the cheetah populations in these two parks. The cheetahs reside on commercial ranches and private farms in this region. Sub-division of share-holder ranches has fragmented this area. We do not know all the factors that may affect the long-term health of these cheetahs.

No new radio collars were deployed in the Salama or Samburu areas in 2011. Due to the difficulty in capturing cheetahs for collaring, we have taken a small step back in this project. The focus of data collecting in both areas is to identify the most used areas and indicators that will allow greater success in future trapping efforts.

In Samburu, the collar placed on a female cheetah (January 2010) ceased transmission in April 2010. Attempts were made in June, July and August 2010 to locate the cheetah with the KWS approved veterinary staff on standby for collar removal. The cheetah was seen several times in between ACK visits by naturalists and county council staff, but each time the ACK staff members were in the area, the cheetah could not be found. In late October 2010, the cheetah 'Nataanywe' was seen with four cubs in Buffalo Springs Reserve by several naturalists and rangers. In November, it was reported that two of the cubs were killed by lion and she remained with two. The cheetah remained with her collar during 2011. Cosmas visited the reserves on three occasions, receiving positive reports of 'Nataanywe' and her growing cubs, but was unable to locate them. Photos from park visitors in February and May 2011 showed the collar was fitting well and moving from side to side. In June 2011, Mary and Cosmas visited the reserves and tracked the family in Buffalo Springs. 'Nataanywe' killed a large impala and the family consumed nearly the whole of it. The cubs remained quite close to her prior and after the meal - thus we decided to schedule the collar removal for mid-August when the cubs were nearer to independence and prior to the time frame for Nataanywe to breed again.

Mary, Chris Lentaam (Samburju field officer) and Dr. Elena Chelysheva found the family (with the help of area naturalists) on 9 August 2011 and the KWS veterinary team immobilized her to remove the collar. There were no marks on her neck – the collar was a perfect fit. The cubs remained within the area during the procedure and reunited with the mother during the night.

Photos: Nataanywe and her female cub two months prior to collar removal, Mary with KWS veterinary team and Dr. Likoniwalla, Neck of Nataanywe after collar removal shows no sign of stress after wearing the collar for 19 months.

The collar was given to Savannah Designs for data recovery. Data was recorded in the collar through 18 April 2010 for a total of 80 days of movement. (Note: our last download was 27 February.) The number of successful readings were 1962 – that is 97% of the hourly readings being successfully recorded during the duration of the collar. The early failure of the collar was due to a crack in the epoxy surrounding the battery so the collar is covered under company warranty and can be replaced. Nataanywe moved differently month by month (Figure 2). For nearly three months she never left the parks and crossed the river on several occasions. This portion of her home range is less than 200 km^2. (A short term study of one cheetah cannot give the full home range.)

Figure 6: Nataanywe movements between 27 January and 18 April 2010

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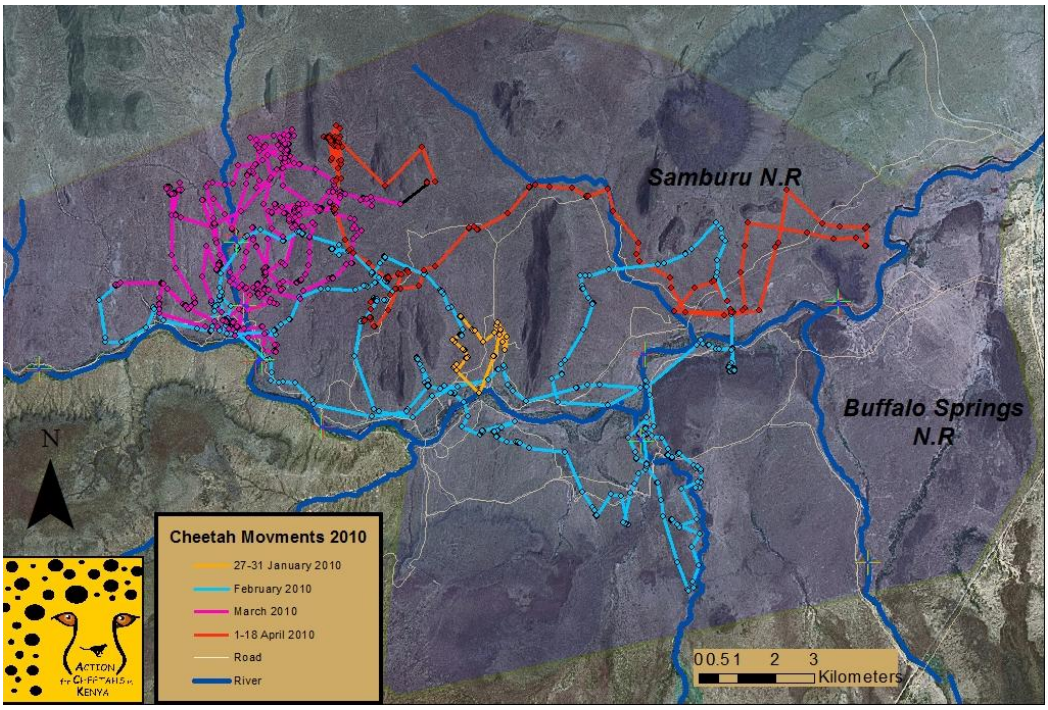


Natanywe's activity levels were consistent throughout the day and night (Figure 6). For the entire three months she remained completely within the reserves. Where "Y" is vertical activity (up and down), a fitted equation for the cubic model that describes the relationship between Y and TIME (time of day) is:

$$Y = 1354 - 2281\ X + 3750\ X^2 - 1529\ X^3$$

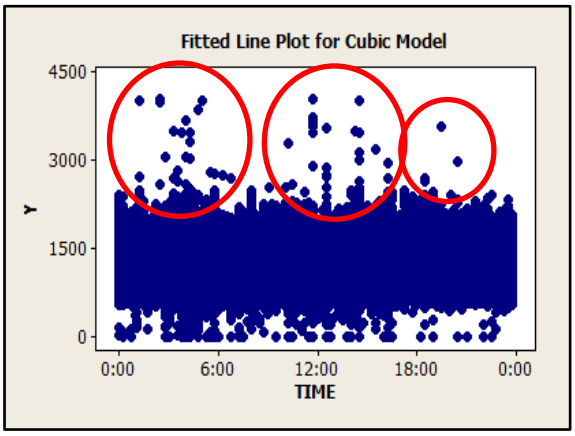
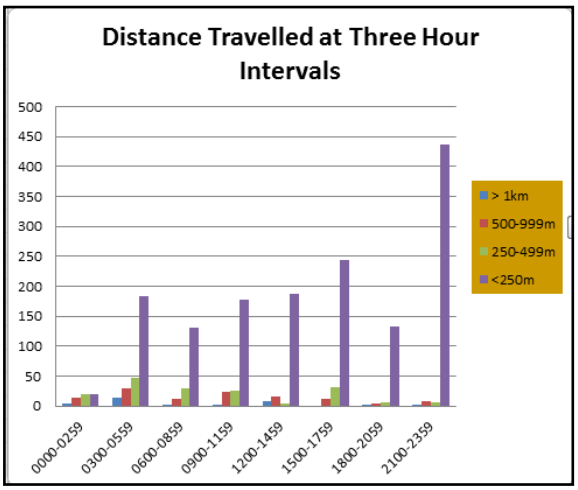
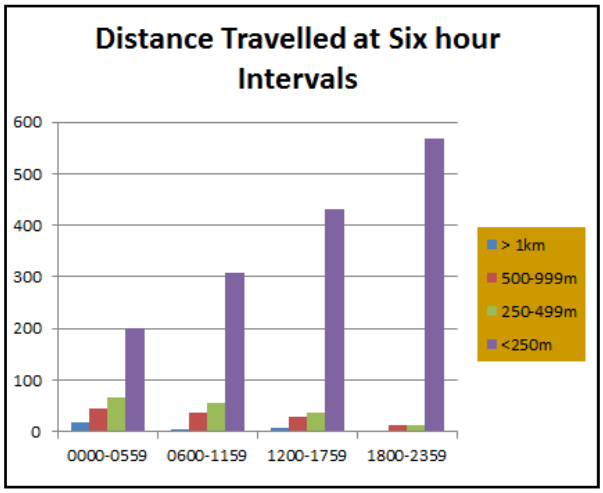


Figure 7: Increased activity 0200-0400, 1100-1500 and slightly 1900-2000, indicators of alertness and/or hunting –majority of points have minimum movement.

This equation can be used to predict vertical activity for a value of TIME, or find the settings for TIME that correspond to a desired value or range of values for Y (Figure 7). However, a statistically significant ($P < 0.05$) relationship does not imply that time of day causes movement. Vertical movement did have a number of outlying points of high activity in early morning and mid-day, but with time explaining no more than 8% of the actions of the cheetah – this likely being head movements and/or alertness (including hunting) in early morning and late afternoons. Horizontal and diagonal movement had similar results.

The mean of the distance travelled between two points is 0.131 km with a minimum distance of 0.0 and maximum of 1.776 km with 82% of distance being less than 250 meters per hour. The time period in which the highest percentage of long travel (>1km) was between 0300 and 0600 – before dawn (Figure 8 and 9). Although we expected that night travel should only occur under a full moon – we actually found that the longer travels occurred with little or no moonlight.





The majority of point distances were less than 250 meter with frequent short movements or no movement occurring throughout the day. Figure 8:When broken into three hour intervals the times when the greatest travel distance occurs between three and six AM and between noon and three PM – these coincide with times just before tourists begin game drives and when the tourist are usually taking their lunch break. Figure 9 uses the same distance data, but projects it into six hour time intervals showing increasing short movements leading up to midniaht.

The ambient temperatures recorded by the collar ranged from 13 to 39 (Celsius) with a mean of 23.2. Movements occurred at all temperatures, but longer travel was more frequent when temperatures were greater than 17 and less than 30.

The relationship between Time of Day, Temperature and Moon Cycle on both the level of activity and the hourly distances travelled were statistically significant (all $P < 0.05$). The information retrieved from only one collar is not enough to make assumptions that all cheetahs behave the same, nor is it enough data to predict long term home range or behavior. This data forms a baseline that can be compared to cheetahs inside and outside of the parks and gives the foundation for continued studies in the Samburu region.

ACK began working in the Meibae Conservancy in May 2010. Chris Simon Lentaam was hired as a field assistant in March 2010. Reports from the Northern Rangelands Trust ranked Meibae as the conservancy with the most frequent cheetah sightings. We selected a site near the Meibae Conservancy ranger headquarters where frequent cheetah tracks and sightings had been recorded over the previous two years. The trap was baited in June, July and August. Cheetah tracks were seen along the road to the trap about 500m from the trap site, but no cheetah was captured during this attempt. A jackal was caught one evening and released.

Between September 2010 and November 2011, Lentaam worked with the Meibae Conservancy rangers, supervised in the field by Fred Longynak and guided in data collection methods and goals by Cosmas Wambua. In December 2011 we met with Lentaam to evaluate the data collected in the past year. The map (Figure 10) of recorded cheetah sightings and tracks in Meibae resulted from Lentaam's work with the Conservancy rangers using the general ranger forms.

Photo: Chris Lentaam (left) and Cosmas Wambua (second from right) on patrol with Meibae Rangers in February 2011.

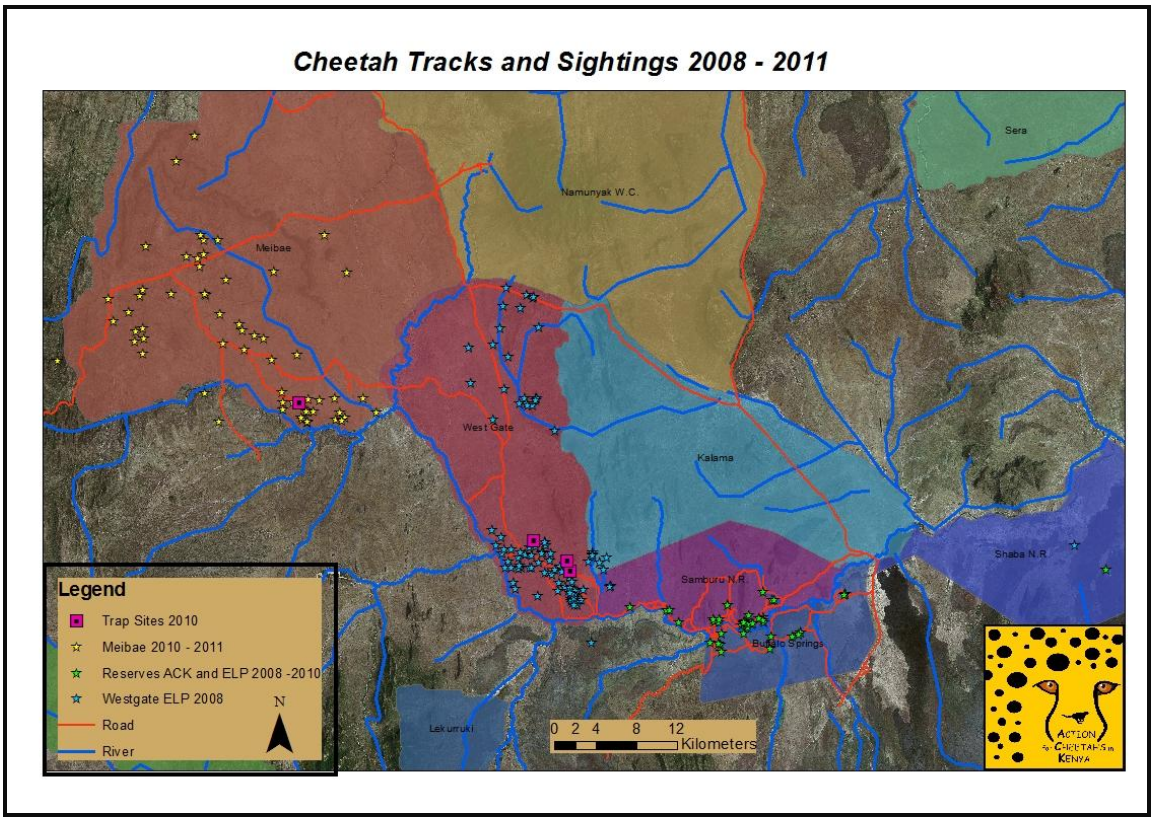


Figure 10: Cheetah distribution using recorded sightings and tracks by Ewaso Lions Project (2008 to 2009) and Action for Cheetahs (2009 to 2011) in Shaba, Buffalo Springs, Westgate, and Meibae. Traps set in 2010 were based on sightings and level of activity (livestock) in the area.

4. Livestock Husbandry and Health

From 2006 to 2010 we assisted in renovations and management of four cattle dips with the goal of encouraging improved livestock husbandry and increased awareness of the cheetah. Data collection at the dips gave us information about livestock management and perceptions about predators. We continue to assist the cattle dips through serving as consultants to the management committees.

Photo: Mary with herders taking cattle through Kima cattle dip

Three of the four dips have been successful in running their dips, and two of the committees have started additional business thanks to the business training provided during the project. The number of livestock receiving tick prevention has reached numbers up to 500. One of the dips started an agro-vet business, providing access to additional livestock health care products for the community. One new dip has partnered with one of the project dips and has also been successful in operations since 2009 – thus returning the number of functional cattle dips to four. Another new dip has requested to become a part of the project, asking to learn from the functioning dips. In the coming year the chemical will need to be re-charged in the functional dips which will also benefit the new dip for their initial charge. ACK staff are assisting the dip managers in seeking government assistance in the recharge and water costs, and in decisions on the new chemical provider. We are proud of these managers for beginning their search this early in the year; an indication that they understand that running a business requires advance thinking.

A community "baraza" is a public meeting where people gather to address issues or to share ideas. In November 2011 ACK began conducting one baraza per month to share information from our studies and give people the chance to ask us questions about cheetahs and other predators. Local administration and KWS representatives attend the baraza to share additional information and to strengthen our joint efforts for a sustainable environmental management. ACK gives a

"Conservation Hero" award to farmers who have improved their livestock breed, their protection and their herding. Each recipient is given a certificate and public recognition for their assistance in livestock loss prevention. The recipient is then given a boost in their community and held up as a mentor for other farmers to learn from.

Photos: Mary presents Environmental Hero award to Mr John D. Mwangangi in recognition of the improvements made to his livestock boma after a leopard attack. Mr. Mwangangi believes that the leopard has the right to exist in the area and maintains a forested area on his property to allow wildlife to have a safe haven.

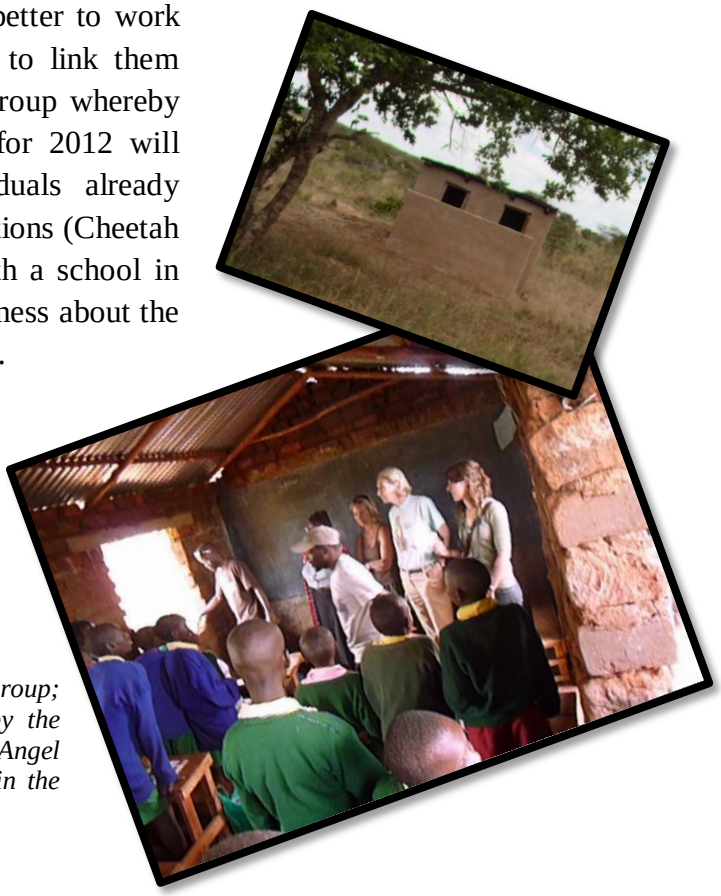
B. PUBLIC EDUCATION ACTIVITIES

1. Capacity Building

Bee keeping seminars conducted in 2009 and 2010 with two community groups provided participants with information and skills to set up and maintain bees for honey production. One community group was from the Ngaamba area and the other from the Malili area. We discovered that working with these groups may not be the right way to address bee keeping – as it is a business that is not for everyone. In the Ngaamba group there are a few members who have maintained their hives and continue to work with Mr. Sam Bananah in harvesting and technical advice. Members of the other youth group have discontinued their associations and are no longer a registered group, thus it has been difficult to track their progress.

We have discovered that with bee keeping it is better to work with individuals that have a strong interest and to link them together rather than working with an interested group whereby only a few members become active. Seminars for 2012 will include harvest and marketing for the individuals already involved. Additionally one of our partner organizations (Cheetah Alliance) started a Bee the Change campaign with a school in Hawaii and a school in Kenya to help bring awareness about the bee and the importance of its environmental impact.

In 2010, a donation was made to build a pit latrine at one of the new schools in the subdivided area of Kiu. The Ndalani primary school was built by the community and began with standard one through three using teachers paid directly by the parents.



Photos: Cosmas and Sam conduct bee seminar with youth group; Pit latrine donated to Ndalani Primary School – built by the parents, but materials purchased through the donation; Angel Fund and Cheetah Alliance guests join Cosmas and Sam in the classroom.

The school received government recognition in 2010, allowing a head-teacher and additional teachers to be posted there. Visitors from the Cincinnati Zoo Angel Fund and the Cheetah Alliance visited the school in May 2011 to congratulate them on their achievements.

ACK is linking with ranches to the north of Salama extending into the Kajiado district to better understand the movements and adaptations of cheetahs threatened by land fragmentations. The Athi-Kapiti ecosystem connects the Salama region with the wildlife population of the Nairobi National Park and forms the corridor for wildlife movement towards Ambolseli National Park. A large portion of the Athi-Kapiti ecosystem is under private management for large scale commercial ranching.

The connection of the two national parks relies on wildlife management practices of the Masai, the Akamba and the private land owners. The Athi-Kapiti Cheetah Project (AKCP) hired three field officers to collaboratively collect data and enhance our joint ability to understand what is needed to protect cheetahs and other predators in this fragile ecosystem. ACK conducted training for the AKCP scouts and will assist with data analysis. Additionally, incoming master's students will be using the large wildlife friendly ranches as a control for camera trapping and faecal analysis.

2. Volunteer Programme

Volunteers and student projects are an important aspect of our work. Peter Barber joined us twice in 2011 for several weeks in February/March and in October/November. Peter assisted with data entry of conflict interviews, trap cage repairs, house and camp maintenance and game counts. Peter is one of our editors for newsletters and annual reports.

Photos: Jimmy with Athi-Kapiti Cheetah scouts; Peter Barber repairing cheetah recovery crate.

Bonnie Blackmore and Amanda Jones joined us in Salama for a week in May and visited Samburu to find Nataanywe. Bonnie is the founder of Cheetah Alliance and volunteers her time to raise awareness about cheetahs and is an importand advocate for the plight of the bees in all corners of the world. Cathryn Hilker from the Angel Fund, and her travel companions Lily and Mark, visited the Salama camp in May for a few days as part of a tour of projects supported by the Angel Fund throughout Africa.

Master's candidate Erica Hermsen joined ACK in June as a ten-week intern from Antioch University New England. She assisted with organizing all of the conflict data from May 2007 through June 2011 for mapping and analysis. She also initiated her proposal for camera trap work. Erica has now joined the ACK team and will be testing different scents, sounds and movements as attractants for cheetahs in collaboration with several US zoos. Her zoo results will determine which baits she will field test at several camera trap stations across Salama and Athi-Kapiti sites to evaluate effectiveness as alternative attractants (bait) to that of a live goat. (Note: when live goats are used as bait, they are kept in separate protective cages.) The cameras will be used after her Master's research is complete to evaluate predator density in the Salama/Athi-Kapititi ecosystems. Additional studies will be conducted by ACK in Salama and Samburu (where the cheetah population and other predators have greater overlap) to evaluate density and distribution of rarely sighted species, including cheetahs.

Photos: Erica Hermsen and Cosmas evaluate tracks while testing camera tra;, rare caracal lynx caught on camera during Erica's pilot project.

Miriam Westervelt joined ACK for a week in July and gave us an introduction to the benefits of participatory management planning. She also assisted with camera trap testing. Mary and Cosmas participated in an online Conservation Management Plan (CMP) programme through the University of Maryland from October through December. The students used the Salama research area to look at shareholder based conservation planning. The resulting document is the base on which our community work will be programmed in the coming years. The students took one aspect of the Salama project for their focus, and ACK will complete the plan with Miriam's assistance in 2012.

Tiffany Cox worked with Lentaam in December to enter all of the past year's Samburu data and assisted with writing articles for our web site. Cindy Wheeler was hired by Project Survival to be the new web master and launched our newly designed site in October. Cindy is also assisting in other social media to help assure that ACK's work is visible. Liz Larson is our longest serving volunteer. Liz is supported by Utah's Hogle Zoo and continues to assist with volunteer communication from the US.

Using a model of ecosystem dynamics, we have identified shrub habitat and dikdik populations as possible indicators for cheetah presence. To further test this theory we have affiliated with a master's student from the University of Nairobi, Nelson Owange, to use faecal analysis to identify cheetah prey consumption in the Salama and Athi-Kapiti ecosystems. In collaboration with Smithsonian Conservation Biology Institute (SCBI) we have also contracted Morgan Maly as a master's student to look at the levels of faecal gluticosteroids (stress hormones) in the same cheetah populations

The two students will work in collaboration with KWS to develop a laboratory protocol for establishing a facility for hormone and DNA analysis in Kenya. Nelson will be trained at SCBI in the US (Feb 2012) and at CCF in Namibia (late 2012) to calibrate the lab as it is being set up.

Photos: Lentaam, Tiffany and Cosmas review Meibae data at the Salama research camp; Jimmy introduces his portion of the Salama research site to Nelson

Dr Elena Cheleshyva received KWS affiliation and Ministry of Education research permits to conduct an evaluation of the distribution and abundance of cheetahs in the Massai Mara and Meru regions. Elena worked with KWS in 2002-2003 on the first complete inventory of cheetahs in the Mara. She will return to the Mara to use a method of spot ID that she implemented introduced during the first study to track family trees and to do a repeat inventory in the Mara. Using the same study design, she will move to the Meru region to inventory and map cheetah distribution in the protected areas of Bisanadi Reserve, Meru and Kora National Parks. Elena is affiliated with ACK and CCF as well as with our US and European partners (Project Survival and Cheetah Friends Europe). Joint project in Scat analysis (hormone and DNA) and camera trapping will commence in 2013 and 2014 once her initial survey is completed.

III. PROJECT BENEFITS

This project supports long-term plans for cheetah conservation and is endorsed by CCF, KWS, the Global Cheetah Master Plan and the Association of Zoos and Aquariums Cheetah Species Survival Plan. ACK is guided by the KWS National Strategic Plan for Cheetahs and Wild dogs launched in 2010, and works in affiliation with local and international partners to achieve goals in cheetah conservation and sustainable livelihoods for people. ACK is a member of Carnivores, Livelihoods and Landscapes (CaLL), a programme which links carnivore research throughout Kenya. By empowering farmers with effective livestock management techniques, ACK is able to promote ecological awareness and greater participation in predator-conflict mitigation. Likewise, our involvement with communities in the research areas (settled areas, pastoral communities and tourism-based areas) provides us with an opportunity to implement poverty-alleviation programmes such as improved livestock husbandry though disease prevention (cattle dip project, herder information), improved habitat (tree planting), reduced game poaching (snare removal), and the promotion of sustainable income generation (bee keeping and handcrafts), all of which have the potential to ease the relationship between humans and wildlife.

Involvement of local authorities and inclusion of local employees improves community relations and conservation attitudes that are key factors for long-term success. ACK employees acquire research skills and knowledge through local and international training to stress the importance of wildlife conservation. Information is shared with local people and used in programme development. ACK's Senior Researcher (SR - employed 2002), Community Liaison Officer (CLO - employed 2004) and Cheetah Scouts (employed 2008) are bridges between researchers and the community. The SR was funded by CCF in his MSc (2008), and both he and the CLO were funded for Cheetah Conservation Biology and Integrated Livestock, Wildlife and Predator Management training at CCF Namibia. The three incoming master's students are partially funded through ACK grants. Training experiences for staff and affiliates lead to career advancement in wildlife conservation. The training materials from the 2008 workshops attended by Lumumba and Cosmas were used to develop a presentation as a part of the cattle dip final training seminar on livestock management as a business (Agribusiness) and in improved research and community programmes.

The differences in cheetah distribution and behaviour in the various regions of Kenya emphasise the need for conservation efforts that work with all stakeholders. The information gathered from each area allows KWS to identify strategies for long-term cheetah conservation programmes and for policy decisions about translocation and problem-predator control. Building programme capacity in collaboration with KWS and local assistants is crucial to the success of cheetah conservation in Kenya. The monitoring of cheetahs and their ecosystems explains some cheetah movements in recently subdivided areas. Little is known about the influences of land use, environmental conditions and prey distribution on the regional adaptations of cheetah behaviours and home ranges. When this information is shared with the local communities, the tolerance for cheetahs improves (D'Udine 2009).

Community development activities build capacity within a community for business and livestock management. These programmes build the foundation for future partnerships and encourage positive attitudes towards wildlife. The development of programmes for schools and tourists directly benefits the recipients, and indirectly benefits those with whom the recipient shares information. Tourism is one of the largest revenue generators in Kenya, and the cheetah is one of the key species that people come to see. The people of Kenya will only benefit from their relationship with tourists if key animals, like the cheetah, continue to thrive.

IV. PLANNED ACTIVITIES – 2012

RESEARCH

- Monitor conflicts in the Salama and Samburu regions for ongoing conflict mitigation and awareness programmes;
- Continue wildlife counts and land-use monitoring in the Salama and Samburu regions for trend analysis;
- Camera trap studies to determine attractants for trapping and collaring of six additional cheetahs in the Salama and Samburu research sites to monitor movements and behaviours of cheetah in varying land-use areas (Erica Hermsen);
- Evaluate cheetah prey selection and stress hormone levels through cheetah faecal analysis in Salama area to develop a model for testing in other regions (Nelsen Owange and Morgan Maly);
- Evaluate the usefulness of camera-traps in estimation of predator density in Salama and the Athi-Kapiti region;
- Partner with Dr Elena Chelysheva to evaluate the status of cheetahs in the Masai Mara and Meru ecosystems using spot ID method, and develop long-term monitoring plan for these critical cheetah populations.

EDUCATION AND AWARENESS

- Continue the development of education and awareness programmes and materials for primary, secondary, local adult, and tourism sectors;
- Conduct environmental education and video presentations at schools in the Salama and Samburu regions including programme monitoring and evaluation;
- Continue the development of local and international student intern programmes by identifying study sites and focus projects with KWS and other stakeholders, following the Wild Dog and Cheetah Strategic Plan;
- Participate in the KWS Large Carnivore Working Group and CaLL to promote links with other predator projects in Kenya, for the benefit of ecosystem preservation.

COMMUNITY DEVELOPMENT

- Monitor Kiu Livestock Dip Project and incoming additions to the dip programme;
- Develop the Craft Sales Programme to create a business which offers an outlet to community-based crafts relating to wildlife and the environment;
- Utilize CMP plan developed in collaboration with University of Maryland students to complete a full stakeholder developed conservation plan in Salama and other key cheetah areas;
- Improve programmes in trees and beekeeping to promote environmental caretaking.

V. BUDGET

Income: 2011 financial supporters include private donations, Cheetah Conservation Fund, Cheetah Friends Europe, Utah Zoological Society and Utah's Hogle Zoo, Cleveland Zoological Society and Metroparks Zoo, Kansas City Zoo, Cincinnati Zoo Angel Fund, St. Louis Zoo Field Conservation Grants, AAZK Bowling for Rhinos, the Fresno Chaffee Zoo, Columbus Zoo, Oregon Zoo, Cheetah Friends Europe, African Travel, Cat Haven, Animal Ark, Binder Park Zoo, Eco-Sys Action, Nature Encounters Safaris, PAWS Safari, and Classic Escapes. Student projects have received grants from Cheetah Conservation Fund and the Disney Worldwide Conservation Fund. Additional income is received from craft sales, speaking stipends, volunteer fees and rent sharing.

Current affiliated organizations include the East African Wildlife Society, Kenya Wildlife Service, African Wildlife Foundation, Machakos Wildlife Conservancy,Mara-Meru Cheetah Project, Ewaso Tracking Project, and Save the Elephant.

VI. STAFF

MARY WYKSTRA – Director, Action for Cheetahs in Kenya (ACK)

Mary studied pre-veterinary medicine at Calvin College in Grand Rapids, Michigan (1982-1984), She received a Bachelor of Science degree in Zoology with a focus in Animal Behaviour from Michigan State University (1987). She completed her Master of Environmental Management at Yale University School of Forestry and Environmental Studies in 2011. She coordinates research in Salama and Samburu through collaboration with the studies in other cheetah ranges within Kenya. Project coordination includes collaring, ecological monitoring (game counts, camera trapping, faecal collection and analysis), and education and community development activities related to cheetah conservation. Research is authorized under the Kenya Ministry of Science and Technology through affiliation with the Kenya Wildlife Service and Cheetah Conservation Fund (CCF). Mary is responsible for administration and for assuring that timely reports are submitted to the appropriate organizations.

COSMAS M. WAMBUA – Senior Research Scientist, ACK

Cosmas holds a Master's degree in Ecological and Systematic Zoology from Addis Ababa University, Ethiopia and a Bachelor of Science degree from Dr. B R Amdedkar University (Agra) in India. His experience in ecological monitoring began in KWS in 2001 after completion of his undergraduate degree. He supervises Salama personnel and all data collection in the Salama study site. He manages the full ACK data base to assure consistency in data collection for comparative analysis and timely reporting. Cosmas works in the field to supervise and advise students, and continues game counts (walking and driving) for trend analysis of wildlife distribution, density and abundance.

P. LUMUMBA MUTISO – Community Liaison Officer, ACK

Lumumba is a small-scale farmer who was born and raised in the Kiu/Salama area. In 2003, his livestock were being killed by cheetah and leopard, but he became interested in predators after meeting with ACK staff. Lumumba was hired as the Community Liaison Officer in 2004. Travelling by motorcycle, bicycle and foot, he collects data on livestock losses and cheetah sightings and relays information to and from the people of his community. In 2008 Lumumba attended training courses in Namibia in Integrated Livestock, Wildlife and Predator Management and in Cheetah Conservation Biology. Lumumba coordinates ACK community activities and field data collection in the Salama area.

CHRIS SIMON LENTAAM, ACK Community Officer Samburu

Chris completed his secondary education at Marsabit Boys School in northern Kenya through a bursary from the Northern Rangelands Trust. He volunteered as a part-time ranger and radio operator for the Meibae Conservancy and participated in training for community work and ranger operations. Chris is interested in pursuing a career in conservation and business. He will be coordinating ACK activities in the Samburu region.

Pius Mutila, Jimmy Kitange – Community Cheetah Scouts and Field Assistants (Salama))
Ken Ochieng and Marck Mutua– Housekeeping Staff (Nairobi and Salama)

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