



OVERVIEW
Year End Report 2013
Cheetah Conservation and Human Impact in Kenya

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



Photos: *Chris Lentaam (left) and Jimmy Muli (right) are two of the ACK Cheetah Field Officers working at the Salama and Samburu study sites collecting data and presenting information about conservation to the community.*

SUMMARY

Action for Cheetahs in Kenya (ACK) is a research project operating under Carnivores, Livelihoods and Landscapes (CaLL) - a registered non-profit company in Kenya. The CaLL Board of Directors and Scientific Advisory Board guide the programmes and activities of ACK through annual meetings and regular correspondence. The cheetah (*Acinonyx jubatus*) is classified as Vulnerable (Durant, Marker et al. 2008). Kenya holds over 10% of Africa's cheetah population with population numbers estimated at 1200-1400. Over 75% of Kenya's cheetahs are resident on land outside protected areas (KWS 2010). ACK works closely with local wildlife authorities and landholders to develop policies and programmes that support wildlife conservation and human livelihoods for the long-term development of sustainable human and wildlife zones. Project 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 is focused in two regions (Salama and Samburu) that are identified as a high priority in the National Cheetah and Wild Dog Strategic Plan (IUCN/SSC 2007) and we follow methods recommended by the Global Cheetah Master Plan. Research in 2013 focused on five themes: 1) completion of six-year wildlife monitoring and cheetah movement in the Salama region; 2) establishing long-term monitoring in the Meibae Conservancy (Samburu); 3) using cheetah faecal samples to determine cheetah prey selection; 4) creating awareness of livestock protection methods; and, 5) encompassing stakeholder collaboration in programme development in both primary study areas.

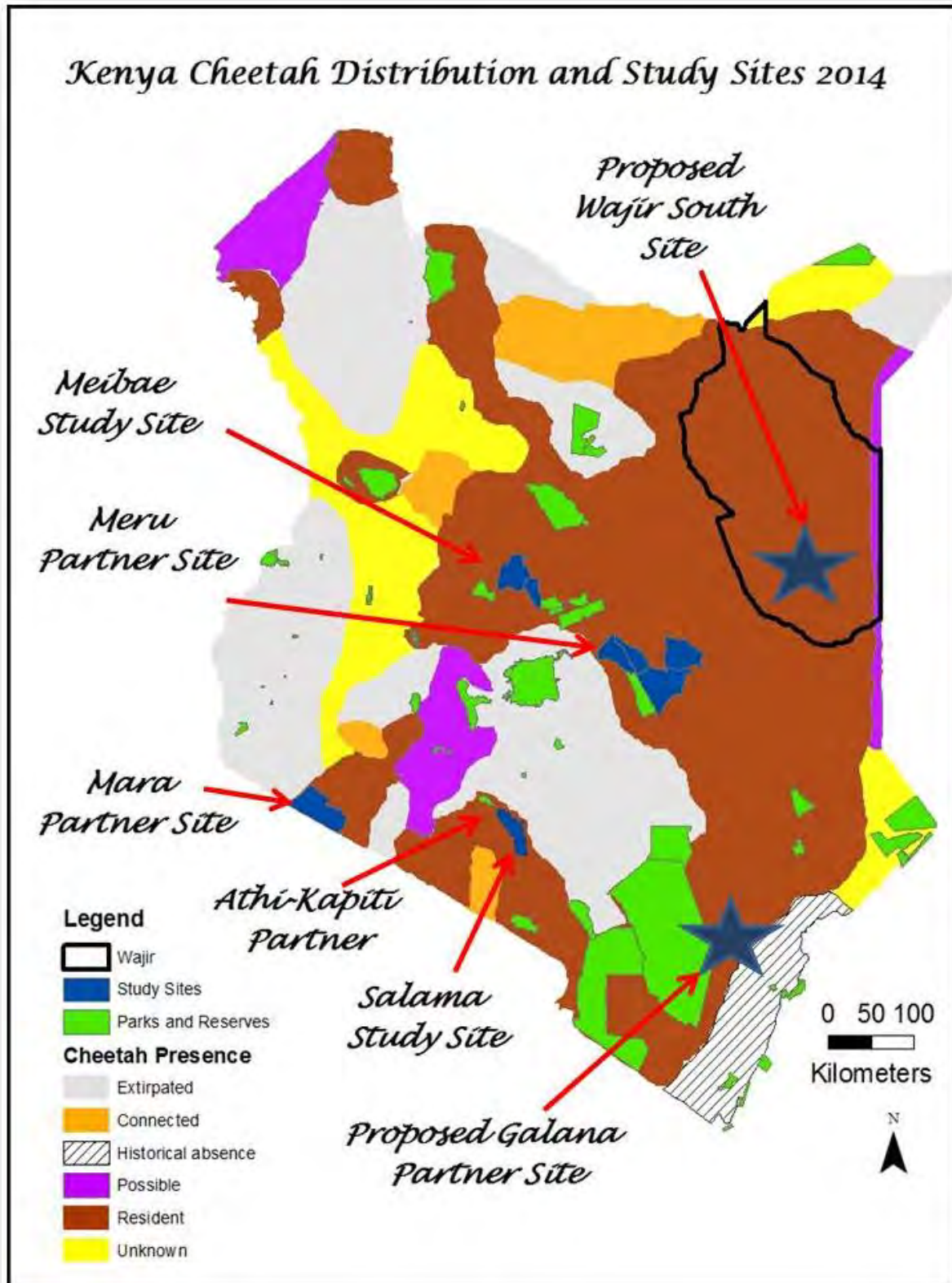
In July 2013, we completed a six year evaluation of cheetahs living in a changing environment. Over the study period, subdivision occurred at a high rate due to commercial ranches shifting to small scale land holdings. In addition, development of new commercial cities in Konza and Malili was initiated by the erection of fencing and disturbance of land. Data analysis showed a decline in all wildlife in the area as a result of the influx of human settlement reaching the threshold whereby wildlife and people can no longer co-exist. We extended research in this region into the Athi-Kapiti ecosystem in 2012 and continue to collect data for comparative research. Camera trapping and

faecal analysis projects are combined with data collected by community field officers to provide information to the Kenya Wildlife Service for long-term conservation policy.

In the Samburu study site the research focus in the Meibae Conservancy provides the baseline for long-term monitoring of cheetahs in the pastoral communities of northern Kenya. Patrol data and game count transects began in 2012 and 2013 respectively and the first phase of our research will be completed in 2014. Community programme implementation will begin in 2014 to share the data and work with the community to develop cheetah conservation strategies in this region.

Community awareness, education and conservation actions in both regions focus on participatory planning through stakeholder workshops, community meetings, school programmes and participation in regional agriculture seminars and fairs. Conflict mitigation includes materials and information shared at community events as well as individual consultations to implement improved herding, improved livestock protection and predator deterrent systems.

Map: Includes the Meibae Conservancy and Salama study sites, as well as the Westgate Conservancy, Samburu Reserve and Buffalo Springs Reserve and the Athi-Kapiti ecosystem which are used as a control for research activities. Our community focus has been in the Salama and Meibae areas to develop materials for use in other regions of the cheetah range. The range of cheetah distribution on this map is based on results from the 2004-2007 National Cheetah Survey. In 2013, ACK was contacted by members of the Wajir community and the Galana conservancy to assist with cheetah conservation efforts in the north eastern districts. Additionally, ACK is proposing to repeat the National Cheetah Survey to document changes in cheetah distribution since 2007 and to evaluate effectiveness of current cheetah conservation efforts.



2013 ACCOMPLISHMENTS (SUMMARY)

RESEARCH (SUMMARY)

Research is the backbone of ACK work in Kenya – results are shared quarterly with wildlife authorities, local administration and conservancies, international partners, local partners and the community.

- Three cheetah field officers collected data on cheetah and wildlife movements in the Salama field site (500 km²).
 - Field Officers completed 79 predator monitoring patrols and 36 walking transects to interact with the community and to complete evaluation of the impact of settlement on wildlife density, abundance and distribution;
 - Field officers completed 60 KWS “MIST” monitoring patrols with each officer using KWS forms twice monthly to assist in monitoring of wildlife and human influences on wildlife habitats;
 - Thirteen reported conflicts were investigated with one being verified as a cheetah conflict;
 - Over 2000 households were provided with information and assistance on boma improvements through individual consultations, group discussions, community meetings and agriculture seminars;
 - Twenty-four predator mortalities were documented due to road accidents in Salama. Between January and June, three adult cheetahs, one pregnant with six unborn cubs, were killed by vehicles along the Mombasa Highway within the Athi-Kapiti control study area (along a 50 km section of road running southwest of the Salama study site). Additionally six hyena (five spotted and one striped) and five servals were also killed within the Athi-Kapiti and Salama study site boundaries;
 - Four snares were found by scouts, and an eland was killed by poison arrow;
 - Cheetah evidence (sightings, scat or tracks) were recorded on fifteen occasions - A single cheetah and a mother with one cub. The public reported seeing cheetahs on twenty-seven occasions - in groups ranging from single cheetahs, two adults, three adults and two mothers with cubs (one and three respectively) for an estimated range of one to eleven cheetahs;
 - Between five and fourteen adult cheetahs were reported in the Athi-Kapiti area in 2013 as confirmed through correspondence with resident farmers and other project field staff. At least four females with cubs (14 in total) and two different groups of two adult males were reported regularly.
- Three Cheetah Field Officers collected patrol and walking transect counts within a 600km² portion of the Meibae Conservancy.
 - Field officers completed 449 patrol surveys in 45 sub-locations within 12 of the conservancy blocks;
 - Field officers completed 132 walking transects;
 - Twenty-three species were recorded during walking patrols;
 - Fifteen game species and four domestic species were recorded during walking transects;
 - Cheetahs were seen on three occasions, and 35 cheetah spoor were recorded during patrols with group sizes ranging from one to four. Additional cheetah sightings were reported with similar social groupings.
- Driving Game Counts (Salama)
 - ACK staff completed 24 morning and 24 night counts between January and July to end six years of wildlife monitoring for trend analysis of the region through DISTANCE software;
 - Twenty-one species were encountered during the counts;



Photo: Cheetah track photographed during patrols in 2013.

- Eight jackal, one bat-eared fox and one serval were sighted during the counts but no cheetah, hyena or leopard were seen.
- Student projects
 - 220 scats (faecal samples) collected in 2012 were catalogued for analysis and a map of collection sites was created an additional;
 - Ms Viola Ruto and Ms Deanna Russell worked with Master's candidate Noreen Mutoro to catalogue hair using samples of hairs from all potential prey and predator species in the Salama and Samburu areas for faecal analysis. Hair descriptions from shoulder, back, rump and belly of 47 species were classified based on colour, texture, hair shaft (digital microscopic photo) and scale pattern (embedded in latex for digital microscopic photo) for the hair reference guide;
 - The team established the scat washing methodology and method for confirmation of cheetah species identification through hair sampling;
 - Ms Deanna Russell was trained in detection dog handling with KK Security in Nairobi, and a dog was received on loan from Canine Specialties from Tanzania. Unfortunately, a tragic accident resulted in euthanasia of the dog;
 - Faecal searches were conducted in areas of known cheetah presence resulting from 75 scats being collected for analysis;
 - The ACK research team conducted forty-eight driving transect counts in the Athi-Kapiti ecosystem to map density and abundance of cheetah prey for comparison to faecal analysis results. This data will be analysed as a part of the master's thesis and will be reported in the 2014 field reports.

CAPACITY BUILDING (SUMMARY)

It is the goal of ACK to build skills and empower future conservation leaders. We strive to partner with experts who can assist in bringing the knowledge, skills and resources to Kenya to determine policies in research, conservation and environmental management.

- Salama Field Officers underwent training from 2012 through early 2013 in Open Standards for Conservation Measures Partnership (CMP) to conduct stakeholder project planning seminars with senior staff in natural resource management;
- Samburu Field Officers were trained in line transect monitoring and distance estimation for conducting line transect monitoring for density and abundance estimations;
- ACK hosted students and interns from *University of Nairobi (UofN)*, *Antioch University New England* and *Savannah College of Art & Design*;
- ACK continues to consult with *Working Dogs for Conservation*, *KK Security* and *Yoani Yapperville Kennels* on detection dog and handler training;
- ACK strengthened partnerships with the *Smithsonian Conservation Biology Institute (SCBI)*, *Cheetah Conservation Fund (CCF)* and *Kenya Wildlife Service (KWS)* to formalize methods and permit processes for stress hormone;
- ACK is working with CCF laboratory facilities to formalize methods for scat DNA isolation and analysis using KWS laboratory facilities;
- ACK formalized a Memorandum of Understanding with the UofN to secure partnership in cheetah conservation studies in collaboration with UofN professors and students;

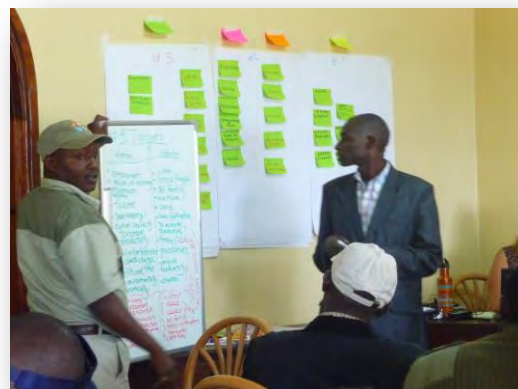


Photo: ACK staff members, Cosmas Wambua and Pius Wamunyu, present information at the Salama Stakeholders Meeting.

- ACK was endorsed by the *World Association of Zoos and Aquariums (WAZA)*.

COMMUNITY (SUMMARY)

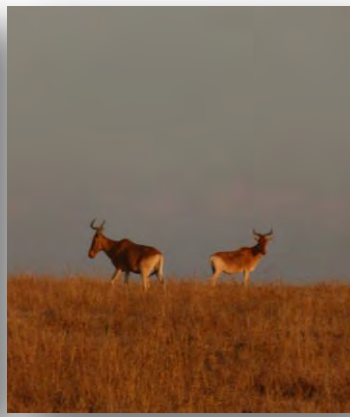
Education programmes instil a conservation ethic and reduce misconceptions about cheetahs and other predators. ACK works with community groups and schools to enhance activities in environmental caretaking and wildlife protection.



Photo: ACK staff, Cosmas Wambua and Chris Lentaam (center) with students from Lekiji Primary School in Meibae Conservancy.

- Five community meetings and “Boma Day” seminars were held to complete the presentation of study results (2009-2012) and facilitate the discussion of conservation issues in the Salama area. “Boma Day” field presentations were given to encourage predator friendly livestock management practices as a part of a two-year education campaign in the Salama area;
- ACK participated in two agriculture shows to share study results and discuss predator loss prevention methods with a greater farming community in the Machakos District;
- A stakeholder meeting was hosted in February at the Meibae Conservancy with ACK conservation partners Northern Rangelands Trust, Kenya Wildlife Trust, Ewaso Lions Project, Grevy’s Zebra Trust and Meibae Conservancy managers;
- A stakeholder conservation planning meeting was held in June with 24 ministry officials, community representatives and land owners from the Salama region;
- ACK attended the Northern Rangelands Trust community conservation celebration to share in the success of linked community conservation efforts;
- ACK officers worked with Green Rural African Development (GRAD) to install and test predator deterrent lighting systems. Nite-Guard self-contained light units were donated for comparative testing. Homestead interviews were conducted at both study sites to identify test locations to be deployed in 2014;
- ACK organized schools in the Salama area to participate in a demonstration walk along 50km of the Mombasa Highway (through Salama town) in February to raise awareness of anti-poaching and the crisis of ivory trade and the ACK director and volunteers participated in a one day walk with Ivory Belongs to Elephants campaign leader Jim Nyamu in the USA in September;
- Ongoing work continued with the Kiima-Kiu Secondary School for water quality improvements through joint work with the Kalamazoo Christian High School (KCHS). KCHS sponsored gutters

Photo: The Salma team building model boma for agriculture shows and “Boma Days”, Hartebeest in the Malili plains during morning game count, ACK staff member, Pius Wamunyu presents information at Boma Day in Salama.



Project Monitoring and Results

Salama Research

Salama research began in 2005 to evaluate cheetah adaptations to a rapidly changing face of Kenya. Radio telemetry provided insight into female cheetah adaptations between 2005 and 2009. Agriculture and commercial developments have occurred in rapid succession following the major division of the Aimi ma Kalungu and Malili ranches in 2007. The focus of ACK work for the past two years has been on threats to the stability of the ecosystem, cheetah adaptations, and a human tolerance for wildlife presence. Nearly the entire study site (80%) of the Salama region has been divided into small subsistence plots, ranging in size from two to twenty-seven acres. The subdivision has resulted in land use change from large range commercial ranching to small-scale private farming. Through this land use change we monitored the change in cheetah movements, the presence of other predators and status of prey. Game counts provide information that allows us to evaluate the density, abundance and distribution of wildlife across a large area. Monitoring patrols in early 2013 focused on signs and sightings of predators to provide evidence of cheetah and other predator presence.

There were 121 instances of predator related evidence collected by our staff. Evidence includes sighting (n = 13), tracks (n = 60), scat (n = 8) or sound (n = 1) of predators seen by the scout and reports (n = 40) given to them (Figure 1). The majority of the evidence of predator presence was through tracks (54%, n=27) and scout sightings (28%, n=14). The cheetah numbers were five adults; most sightings and tracks were of a single individual, but on different occasions there were two females with cubs (two and three respectively), and a group of two males. The tracks of the single individual were in the same general area leading us to believe it was one individual, not different cheetahs. The two females with cubs remained in the area at different times and the cubs were different enough in age that we are certain it was different families. The two males are believed to be the same two that have been frequenting the area for the last three years. These males are likely to be the same two males that have been captured on camera at Kapiti Estate as their absence from Kapiti corresponds to their presence in Aimi and Stanley ranches.



Salama Patrol 2013					
Species	Sighting	Track	Scat	Sound	Reported
Bat-eared fox	2	5			
Caracal		9			
Cheetah	1	13	6		28
Jackal	7	3			7
Leopard		3	1		1
Serval	1	1			1
Spotted hyena	2	25	1		3
Striped hyena		1			

Figure 1: Patrol data is used to confirm presence of cheetah and other predators. Field officers recorded sightings, tracks, sounds and reported evidence of the predator presence. This data does not provide density or abundance, but can be used to estimate population size for reporting purposes only. (Photo: cheetah track)

ACK conducted game counts along transects on the Kima, Stanley, Aimi and Malili ranches between 2008 and 2013. Due to fencing after land subdivision some driving transects needed to be changed over time, so we included formal walking transects to cover areas where ACK vehicles can no longer pass. Walking transects (36) were conducted each month on the same day, time (morning only) and location by each field officer along a distance of 5 km. Dikdik were the most common species seen on the 2013 counts (Figure 2).

Salama Walking Transect 2013							
Species	Frequency	Number Sighted	Average Group Size	Species	Frequency	Number Sighted	Average Group Size
Dikdik	36	59	2	Serval	3	3	1
Guinea fowl	30	184	6	Bat-eared fox	2	3	2
Yellow neck spurfowl	23	52	2	Porcupine	2	2	1
Baboon	22	227	10	Steinbuck	2	4	2
Vervet monkey	17	100	6	Bush baby	1	1	1
Jackal	11	21	2	Caracal	1	3	2
Bushbuck	7	12	2	Duiker	1	1	1
Cape hare	5	6	1	Goat	1	16	16
Cattle	3	29	10	Warthog	1	1	1
Impala	3	24	8				

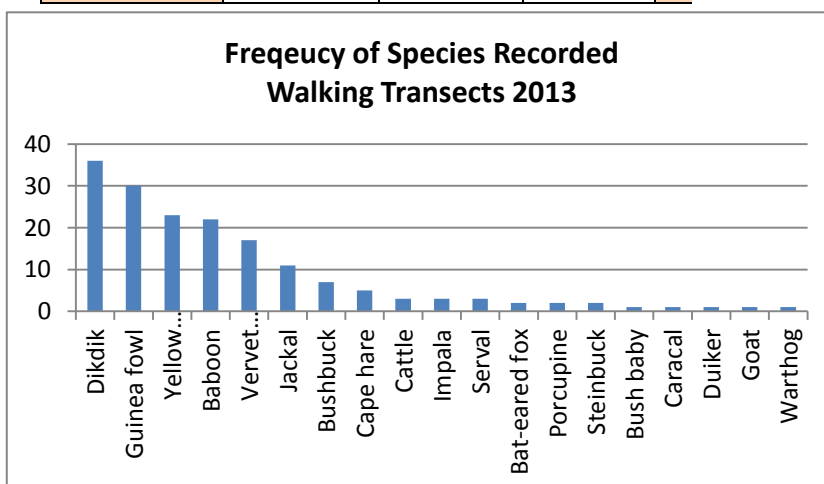


Figure 2: Walking transects record only those animals seen at the time of the transect. Distance, direction and GPS recordings enable the sample to be used in estimating density and abundance. Combined with driving transect data the density and abundance of cheetah prey and other predators can be determined throughout the study area.



Photo: Volunteer, Job Mathias assists ACK Board Member Peter Barber and ACK Senior Scientist, Cosmas Wambua, during game counts.



Driving transects (48) were conducted in the morning and the evening by ACK staff using the same criteria as walking transects, but at a speed averaging 15 km per hour and over a distance of 10-12 km. Recordings (n = 407) were taken with GPS location, time, distance and angle for each species that could be considered prey or competitor for the cheetah. In the final analysis one year of data will be used, however in this report we are including only 2013 data. Small prey including Cape hare (n = 80), Thompson’s gazelle (n = 61), springhare (n = 47) and dikdik (n = 35) dominated the prey base most frequently sighted (Figure 3). Larger prey like kongoni (hartebeest) and wildebeest still occur on the plains of the Malili ranch, but numbers are reducing when compared to previous years as the 5000 acre Konza City (ICT) and settlement around the area continue. KWS is frequently requested by the community to chase the game species from the area due to conflict with crops and grazing area. A comparison of numbers in the Athi Kapiti ranches show that a large portion of the game seek refuge on Lisa Ranch, Game Ranching, Kapiti Estate, and Machakos Ranching.

Species	Frequency	Average Group Size	Species	Frequency	Average Group Size
Cape hare	80	1	Zebra	10	16
Thompson’s gazelle	61	3	Impala	7	10
Kongoni	58	9	Vervet monkey	5	2
Spring hare	47	2	Bushbuck	4	1
Dikdik	35	2	Jackal	4	2
Wildebeest	21	5	Aardvark	1	1
Duiker	17	1	Baboons	1	32
Guinea fowl	16	15	Bat-eared fox	1	1
Grants gazelle	12	3	Reedbuck	1	1
Steinbuck	11	1	Serval	1	1
Yellow neck spurfowl	11	2			

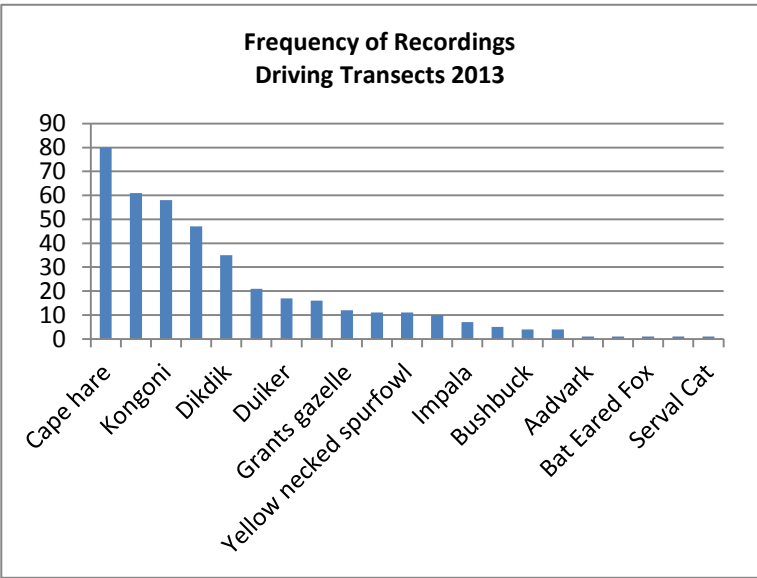


Figure 3: Driving transects are conducted in early morning and late evening. These transects are in slightly different locations to the walking transects and give a broader picture of the species distributed across the study area.

game species for a trend analysis over the period prior to and through the land changes. Using the Master’s thesis study completed by Cosmas Wambua (2008), we can now identify the impacts the changes have on habitat usage by the cheetah and other wildlife. Remote sensing images will provide vegetation changes over time and using a dynamic model developed by Mary Wykstra (2011); we can confirm the value of the intact scrub ecosystem and the effects of fragmentation on prey and predator during dissolution of their habitat.

Documentation of cheetah sightings reported by the public and evidence secured by field officers allow us to track the change in cheetah numbers since 2006 (Figure 4). Monitoring prior to 2008 was conducted by one field officer and after 2008 three field officers were in place. Despite ACK conservation efforts and increased awareness of cheetah presence and livestock protection methods, the frequency of cheetah sightings has steadily declined after the 2007 subdivision (figure 4) and subsequent settlement in 2008 onwards. The settlement in the Aimi, Malili and Kima ranches is now nearly 50% meaning that the habitat available for wildlife is cut in half. The impact of the settlement includes game proof fencing, crop fields, and unsustainable resource exploitation. Preliminary findings show that since the division of Aimi and Malili ranches in 2007, the division of the Kima ranch in 2012 and increased settlement in the Ngaamba and Kiu regions the area has little suitable habitat for game or predator. Essentially this research has documented the near extirpation of predators and the extirpation of most of the diversity of game in the region. In five years’ time, the Salama area has gone from having biodiversity that rivalled that of most national parks and reserves, to a mosaic dominated by small scale plots. The dominant livestock that was managed on the commercial share-holder ranches was cattle, but along with subsistence agriculture there has been a shift from quality beef and dairy cattle to small stock (goats and sheep) as the dominant domestic livestock product. While zero grazing is encouraged in such landscapes, the numbers of livestock moved into this area are far exceeding the potential carrying capacity and are further degrading the land as they are taken for external grazing and to community water points. If this trend continues, the land will not only cease to support wildlife, but will also cease to support livelihoods of the people.

Cheetah Population Change in the Salama Ecosystem 2006 - 2013								
	2006	2007	2008	2009	2010	2011	2012	2013
Population Maximum	21	28	29	25	20	14	15	9
Population Minimum	12	15	14	7	8	8	5	0

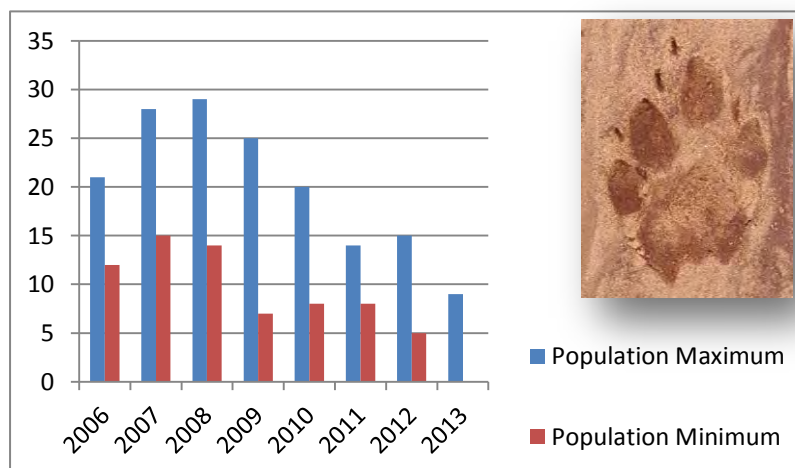


Figure 4: Changes in cheetah population in the Salama ecosystem show declines in both minimum and maximum population size. Estimates are based on sightings, tracks and reports from the community. The population estimates include sub-adult cubs over 6 months of age. In 2013, there were several months where no cheetah evidence (0) could be found.

Information on human-wildlife conflict and attitudes towards conservation was collected via interviews when livestock loss was reported to us by the owner or neighbours. With the influx of new residents and the lack of compensation for loss or for the reporting, the frequency of reports has declined to only 13 conflicts in 2013. In four cases there was no evidence to support the actual species responsible for the loss,

on three occasions hyena were responsible and on two occasions leopard were responsible. In three cases the owner/herder accused the cheetahs that were seen in the area, but evidence supported the cheetah as the culprit on only one occasion. Five of the losses occurred between the times of 2000 and 0600 inside of the boma, four occurred after 1700 while herding near the homestead and one occurred away from the homestead while herding (Figure 5). The herding incident was unnoticed until after the livestock returned to the homestead in the evening and no evidence could be found to identify the responsible predator. Diligence in herding, and the network of communication with ACK field officers and neighbours are believed reasons for prevention of day time losses. Night time loss reduction is a result of better boma construction and increased awareness of the presence and behaviours of the different predators.

Reported Livestck Conflicts 2013										
	Time (all incidents)				Number of Livestock Killed	Number of Livestock Injured	Predator Responsible			
	0001 - 0600	0601 - 1200	1201 - 1800	1801 - 0000			Cheetah	Leopard	Hyena	Jackal
Cattle					0	0				
Goat	2	1		1	4		2	3		
Sheep	3			4	6	1				4
Dog	2				1	1				



Figure 5: 2013 conflicts with time of day and culprit as identified. Note that in two attacks there were both an injury and a death at the time of the attack.



Photos: 2013 Crop raiding and predator interviews gave us the baseline information for deterrent lighting tests to start in 2014.

Interviews were conducted for the testing of predator deterrent lighting systems in November and December 2013. Nearly all (n=27) of the interviewees (n=30) reported livestock depredation in the past year, but none of these incidents had been previously reported to ACK. It is obvious that the residents are no longer reporting conflicts to ACK, or that their perception of continued conflict is greater than the actual incidents that occur. Since we did not ask the residents to provide evidence of the continued losses we will conduct further investigation into perception and actual losses in the past three years. The new Kenya Wildlife Act now has compensation for loss of livestock when due care is taken to prevent such losses.

ACK has worked hard in the community to build improved bomas, to increase herder attentiveness and to provide information about prevention of livestock loss to predators. It is our hope that the care people take to prevent losses will be evident in this area and that the combination of continued advice from ACK and the enactment of the new law will improve the status of predators in this region. ACK as an organization does not believe that compensation is an answer to human-wildlife conflict (HWC). We do, however, recognize that compensation can increase tolerance for losses that occur when due care is in place. While the other predator species are not the focus of our research, we have implemented programmes in loss prevention and tolerance for their presence as a part of a healthy ecosystem.



Photo: *Community Baraza with each staff member discussing a topic of our research*

The “build a better boma” campaign continued through the year using display models and poster presentations at community meetings and agriculture seminars. In previous years the field officers advised individuals and assisted in boma construction as settlement increased in the area. Although individual consultations continue, we reach a larger audience through group meetings and public presentations.

Wildlife mortalities are recorded by ACK when they are confirmed and documented by our staff (not hearsay) and are reported to KWS. Although scouts no longer patrol the Athi-Kapiti area, we have documented three cheetah mortalities (January, April and June) and three hyena mortalities along the 50 km section of road extending from the Game Ranching north-eastern boundary to the Mailili ranch boundary. One cheetah was pregnant with six unborn cubs. Zebra, serval and giraffe mortalities were also documented by ACK staff along the same section.



Photos: Mortalities in the Salama area in 2013 including genet, serval, cheetah honey badger, hyena. Snare removed from fence at Konza ICT

Within the Salama study area several species were killed along the highway (figure 6), particularly along the five km stretch adjacent to the Konza ICT fence-line, and two mortalities along the fence were also recorded. Only one case of a targeted animal killing was documented - an eland killed by an arrow near the Ulu Conservancy of the Aimi area where the conservancy allows community livestock grazing. The conservancy dealt with the incident through discussions with the community to assist in anti-poaching efforts and assure continued grazing opportunities within the conservancy.

To further document highway threat we began collecting domestic animal deaths in July 2013 (Figure 7). This data collection is to evaluate the livestock and wildlife corridor correlations, the potential impact of animal-vehicle collision and the feasibility of identifying key usage areas for future crossing mitigation. Domestic dogs have a low survival averaging less than four years in the Salama community (D'Udine, MSc 2006) even prior to the development in this region. Highway accidents are also a great threat in the region due to poor enforcement and obedience to road laws. Adding the need to avoid collision with animals increases the risks of traveling along the sections of the roads where domestic and wild animals are crossing the highway. Implementation of corridors for animal crossings (underpass, over pass, signage, speed bumps, and alert systems) have proven to successfully reduce or eliminate risks in other countries both increasing the security of the people and reducing the impact of motor vehicles on wildlife mortality.

Mortality Recorded in Salama in 2013						
Species	Number	Cause of Death	Date	GPS		Area
Serval	1	Road kill	16 Jan 2013	299153	9814752	Malili
White-tail mongoose	1	Road kill	24 Jan 2013	303113	9799562	Kwa Kavoi (Aimi)
White-tail mongoose	1	Road kill	25 Jan 2013	304116	9798540	Kona Mbya (Aimi)
Genet	1	Road kill	26 Jan 2013	304280	9798228	Kona Mbya (Aimi)
Spotted hyena	1	Road kill	4 Feb 2013	302199	9800120	Aimi
Cheetah (female and 5 unborn cubs)	6	Road kill	9 Feb 2013			Manzoni area (KWS collected and photographed)
Secretary bird	1	Road kill	28 Feb 2013	299294	9813136	ICT (Malili)
Zebra	1	Road kill	14 Feb 2013	299071	9815828	ICT (Malili)
Eland	1	Poaching	15 Feb 2013	303697	9803010	Ulu Conservancy (Poison arrow)
Striped hyena	1	Road kill	6 Mar 2013	302198	9800424	Ndavo (Aimi)
Secretary bird	1	Road kill	28 Mar 2013	299294	9813136	ICT (Malili)
Kongoni	1	Hit fence	2 Apr 2013	296650	9814346	ICT (Malili)
Serval	1	Road kill	7 Apr 2013	299152	9814709	ICT Malili
Serval	1	Road kill	20 Jul 2013	308867	9788452	Kima
Cheetah	1	Road kill	11 Apr 2013			Kapiti - 1.5 km north of main entry
Cheetah	1	Injured (fatal)	22 Jun 2013			Small World - 200m north of main entry
Serval	1	Road kill	21 Jul 2013	308867	9788452	Kima
Aardwolf	1	Road kill	19 Aug 2013	300313	9805454	Malili
Spotted hyena	1	Road kill	14 Sep 2013	302200	9800322	Aimi
African Civet	1	Road kill	23 Sep 2013	304701	9797548	Aimi
Genet	1	Road kill	5 Oct 2013	305034	9795816	Tangu (Salama)
Spotted hyena	1	Road kill	11 Oct 2013	299240	9813709	ICT Malili
White-tail mongoose	1	Road kill	17 Oct 2013	302702	9799658	Ndavo (Aimi)
Spotted hyena	1	Road kill	22 Oct 2013	297848	9810652	Malili
Serval	1	Road kill	30 Oct 2012	298148	9818717	Malili
Jackal	1	Road kill	30 Oct 2012	295457	9824211	Kapiti
Genet	1	Road kill	4 Dec 2013	299410	9810772	Kautandini (Malili)
Genet	1	Road kill	4 Dec 2013	301072	9803168	Kautandini (Malili)
Spotted hyena	1	Road kill	18 Dec 2013	286385	9834262	Manzoni (Athi)

Figure 6: Wildlife mortality documentation within the Salama study area. Mapped below the areas of highway threats are apparent. Twenty-seven out of the twenty-nine (93%) recorded mortalities in 2013 were road kill.

Domestic Mortalities						
Species	Number	Event	Date	GPS	UTM	Area
Domestic dog	1	Road kill	20 Jul 2013	304250	9798266	Kona Mbya (Aimi)
Domestic dog	1	Road kill	29 Jul 2013	304432	9797904	Kona Mbya (Aimi)
Domestic dog	1	Road kill	30 Jul 2013	300833	9802932	Kautandini (Malili)
Domestic dog	1	Road kill	16 Sep 2013	304076	9798612	Aimi
Domestic dog	1	Road kill	5 Oct 2013	305034	9795816	Tangu (Salama)
Domestic dog	1	Road kill	7 Oct 2013	300971	9803560	Kautandini (Malili)
Domestic dog	1	Road kill	10 Oct 2013	302241	9800220	Ndovoi (Aimi)
Domestic dog	1	Road kill	4 Dec 2014	299030	9816968	ICT area
Domestic dog	1	Road kill	4 Dec 2014	300521	9804834	Kautandini (Malili)
Domestic dog	1	Road kill	4 Dec 2014	300497	9804909	Kautandini (Malili)
Domestic dog	1	Road kill	4 Dec 2014	300093	9805948	Kautandini (Malili)
Domestic dog	1	Road kill	4 Dec 2014	301802	9802410	Malili
Domestic dog	1	Road kill	16 Dec 2014	300183	9805824	ICT area
Domestic dog	1	Road kill	18 Dec 2014	303241	9800274	Aimi
Goat	1	Road kill	6 Jul 2013	302785	9899632	Aimi

Figure 7: Domestic animal mortality in 2013 due to road kill. We believe that more domestic animals are killed on the highway, but are cleaned up by the owner to feed meat to their dogs or in some cases to consume by the family.

Development in the Malili Ranch - Konza Information and Technology Center (ICT)

Most internal farm fences were removed from Aimi and Malili after the subdivisions, thus making poaching through snaring more difficult and the number of snares encountered by ACK field officers reduced between 2008 and 2012. For a short period of time the game numbers in the Malili area increased as settlement did not occur in the plains area. The completion of the Konza City (ICT) security fencing around the 5000 acre construction site in 2012 created a new area for poachers to use for snares and for hunting with dogs. A formal dedication ceremony was held in April 2013 after boreholes were sunk to provide water for road and building construction. Lack of adequate patrols, repairs and security resulted in holes in and under the fence created by poachers, herders (grazing inside the boundary), animals and animal rights activists. Poachers targeted animals that learned to move in and out of the fence through a limited number of paths and continue to drive animals into the fence. Regular anti-poaching patrols are routine for ACK, KWS and the neighbouring ranches with fewer incidences of wildlife death reported from hitting the fence since July 2012 after efforts discussed in previous reports gave wildlife the time to know the fence boundaries. Two snares were documented by ACK staff in 2013. We believe that more poaching does occur since the open area

makes it easy for poachers to see security approaching and remove evidence or to escape prior to being witnessed by the officers. Herders with dogs are often reported to be poaching within the fenced area, but little security within the fence makes insecurity for our officers an issue as well.

Along two sides of the fence, the land is completely divided into seven acre plots and settlement is occurring as agriculture and commercial plots are being developed. The Konza Ranch opposite the ICT fence and across the Mombasa Highway was subdivided in March 2013. Although settlement has been halted based on the previous agreement that wildlife corridor and watershed plans would be created, the level of disturbance in the area has increased. The reduction of grazing areas for antelope and gazelle resulted in massive human-wildlife conflict as the new settlers attempt to practice traditional agriculture on the savannah grassland. KWS and community groups often attempt to chase the animals away from the smallholdings and into the neighbouring pastoral communities and commercial (wildlife friendly) ranches causing further conflicts among the community and the wildlife. When the wildebeest and zebra returned, they entered the Athi-Kapiti ranches in large numbers. The future of the animals in and around the ICT fence is still questionable.

ACK held the first stakeholders meeting to discuss natural resource management and conservation in the Salama area. Ministry representatives from the livestock, wildlife, roads, and youth enterprise offices were invited to attend along with members of the community representing the areas of ACK research focus. Managers from the Stanley Ranch and Ulu Conservancy were also included in the meeting. Cosmas Wambua chaired the meeting which incorporated open standards for adaptive management technique including the use of Miradi software. The goal of the meeting was to create the link between administration and community to identify joint programmes that will be embraced by all levels of stakeholders in the area. Even within this region, there are different land uses and priorities among the members of the communities, thus ACK will be hosting focus group meetings through the end of the year.

Athi-Kapiti Control Site vs. Salama Field Site

In 2012, ACK included the portion of the Athi-Kapiti commercial ranchland into studies of the Salama region as a control site with wildlife friendly ranching. We expected there would be a greater density and diversity of game and predators where the human impacts were low. Camera trap studies conducted by master's student, Erica Hermsen, although aimed at evaluating bait in attracting cheetahs also gave us a glimpse of diversity of species between the commercial ranches of Athi-Kapiti and the wildlife friendly sections of the Salama study area. We targeted the bait study in the sections of each study area where cheetah sightings were most frequent to increase the chances of capture of cheetah at bait stations. Interestingly, the higher diversity of species was captured on camera in the Salama site. Cheetahs were only captured on camera at the Athi-Kapiti sites while leopard were only captured at the Salama sites. In addition to completing an evaluation of the bait preferences, Ms. Hermsen will also be evaluating the species diversity and advising a new student on camera trap transect surveys in the Salama and Athi-Kapiti field sites.



Photos: *Noreen Mutoro, Cosmas Wambua and Viola Ruto collecting and analysing data for Salama and Athi-Kapiti comparison of cheetah prey density, vegetation and diet selection.*

Athi-Kapiti was also used as a control in cheetah faecal studies initiated in 2012. Over 200 scats were collected by scouts and students on attachment with ACK in 2012. Prior to analysis of the scats a prey hair catalogue was needed. Although several other (not ACK) students have conducted analysis of faecal hair content in affiliation with KWS, none of the students left the reference catalogue for future use. Noreen Mutoro proposed a master's level attachment to complete the scat analysis project using scats collected in 2012. She formulated the washing method that best fit the available resources in the KWS laboratory. We hired Viola Rono to work in affiliation with KWS to create a digital reference catalogue and dichotomous chart for all prey and predator species. They will use Noreen's method for determining the species origin of scats collected without the use of a scat detection dog. Noreen will compare 2012 and 2013 scat collection methods and prey selection with game count data from the Athi-Kapiti and Salama study sites. Noreen conducted game counts in the Athi-Kapiti study site while collecting an additional 100 faecal samples. Her thesis will be completed in 2014

Meibae Conservancy

ACK has been active in the Samburu region since 2010, with concentrated monitoring in the Meibae Conservancy since 2011. Materials established in Salama were used to develop data forms and methodology for the Meibae cheetah field officers. Three field officers cover over 500km² in the lower 2/3's of the Meibae Conservancy encompassing portions of the Masse, Lpus, Mpassion, Lantare, Barsalinga, and Silango blocks (Figure 8). Cheetah field officers often walk with Meibae patrol officers, with KWS or with other warriors or herders. Insecurity in this region is attributed to escalated elephant poaching and road banditry between Wamba and Maralel, making it increasingly difficult to conduct unarmed monitoring programmes.

A researcher stakeholder meeting was held in February to bring current and proposed research projects into contact with each other. In attendance at the meeting were representatives from the conservancy board, the Kenya Wildlife Service, Kenya Wildlife Trust, Ewaso Lions Project, Grevy's Zebra Trust, Northern Rangelands Trust, the Meibae Grazing coordinator and ACK. Each group presented their current and on-going program and objectives and information about their plans within the Meibae Conservancy. Closing discussions provided suggestions for future meetings to include the the Northern Water Services Board and the District Commissioners office and for further discussions on the Conservancy vetting process, requirements and expectations for research projects and fee structure.



Photo: *February 2013 Stakeholder meeting to set the goals for collaborations in the region.*

Following the stakeholder meeting, ACK staff evaluated the data forms and community projects needed for successful cheetah conservation in this region. Walking transects will continue through the year to provide significant data for the DISTANCE analysis. Field officers added conflict documentation, lost livestock assistance and meeting documentation to the list of activities. Boma monitoring for testing of predator deterrent lights began in December for field tests to include weekly disturbance verification, camera trapping and light installation in 2014.

The presence of rangers and scouts provide added security in the area, not only for the wildlife but for the people as well. Training and integration of the new Cheetah Field Officers (scouts) began in

2012, and we implemented our programmes slowly to allow staff to become known and trusted within the community and among the conservancy rangers. Cheetah field officers enhance the current Meibae conservation efforts through livestock loss prevention, attending community meetings and cheetah specific data collection.

Cheetah numbers in the monitored section of Meibae Conservancy in 2013 range from three to ten adults/sub-adults each month based on tracks and reports. Cheetah numbers in the Meibae conservancy ranged from six to 22 adults/sub-adults average per month since 2011 based on NRT and ACK patrol reports. Thus, the Meibae cheetah population was on the low end of the previous averages in 2013. There is no indication of targeted human caused cheetah mortality nor other cheetah deaths recorded, thus we believe that the decline is due to weather (drought) and/or an increased presence of livestock in the area. Meibae Conservancy patrols are conducted by 23 rangers and occur daily over the entire Conservancy (figure 8)

ACK Field Officers conduct patrols where any track or sighting is recorded for species that are potential cheetah prey, competition with cheetahs or are the large species monitored by Meibae in collaboration with the Northern Rangelands Trust. Transect monitoring is conducted on four locations by each field officer along a 5 km line whereby sightings are recorded within a 200 meter distance from the line. The total number of species documented on patrol is greater than those on transects due to the length of time, distances covered and the recording of predator spoor as well as sightings (Figure 9). Analysis of 2013-2014 transect sampling and detailed prey monitoring will provide a list of threats and solutions.

Cheetah presence in 2013 can be mapped in comparison to the presence of other predators (Figure 9) and in the presence of other prey species (Figure 10). Jackal are the most common predator sighting (n=154) and their spoor was seen on 30 occasions. Hyena spoor (n=172) were frequently seen, but actual hyena sightings were 13. Cheetahs spoor were found on 35 occasions and cheetahs were seen by the scouts on three occasions. Wild dogs were reported frequently by the community, and seen six times by ACK officers. Caracals were sighted on seven occasions.

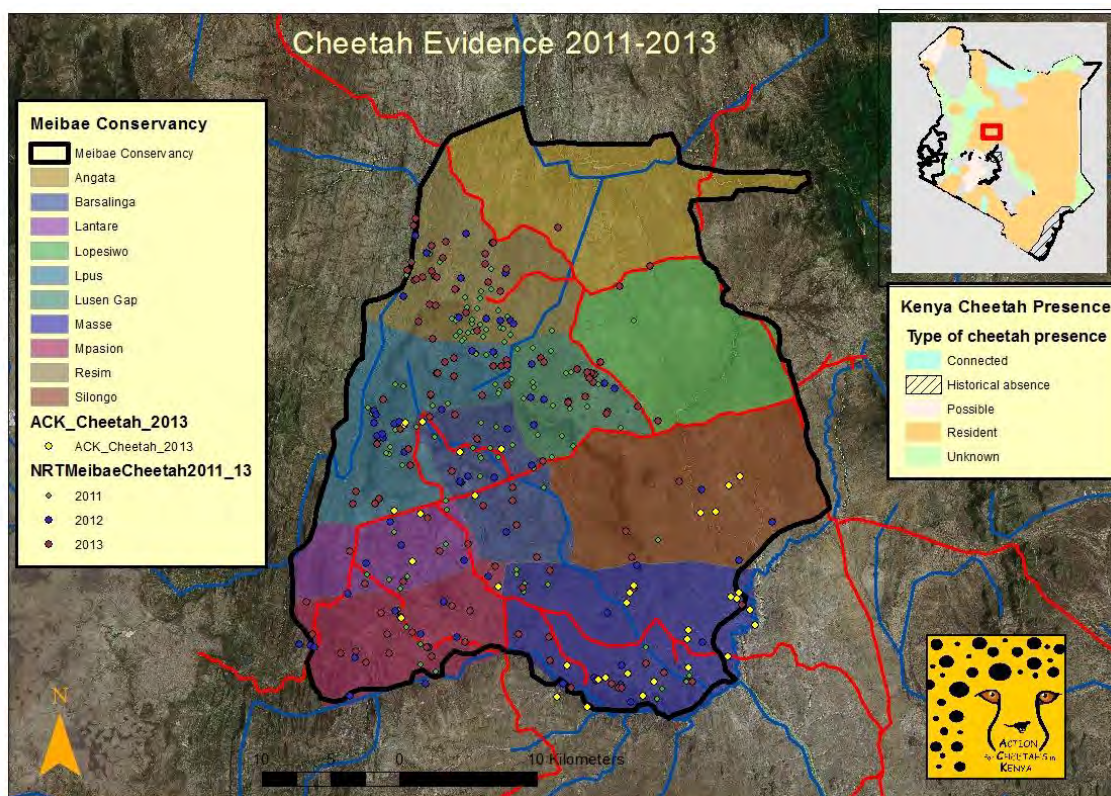


Figure 8: (Map) Cheetah monitoring by the ACK and Meibae Conservancy in 2013. (The focus of ACK field officers has been in the southeastern section of the conservancy. Additional scouts will be hired in 2014 to extend coverage further north and west. Additional data and community programmes will also be included in the extended coverage.)

Predators in Samburu 2013			
Species	Average group size	Sighting	Track
Jackal	1.5	154	30
Hyena	1	13	172
Cheetah	1.5	3	35
Leopard	1	15	25
Caracal	1	7	
Wild dog	5	6	6
Bat-eared fox	2	5	3

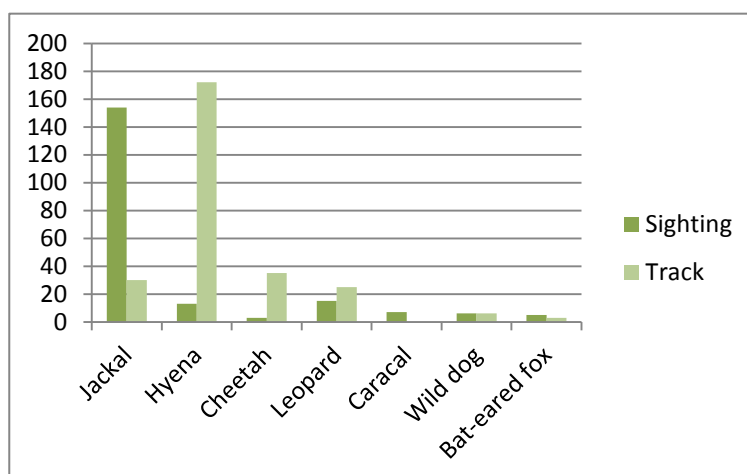


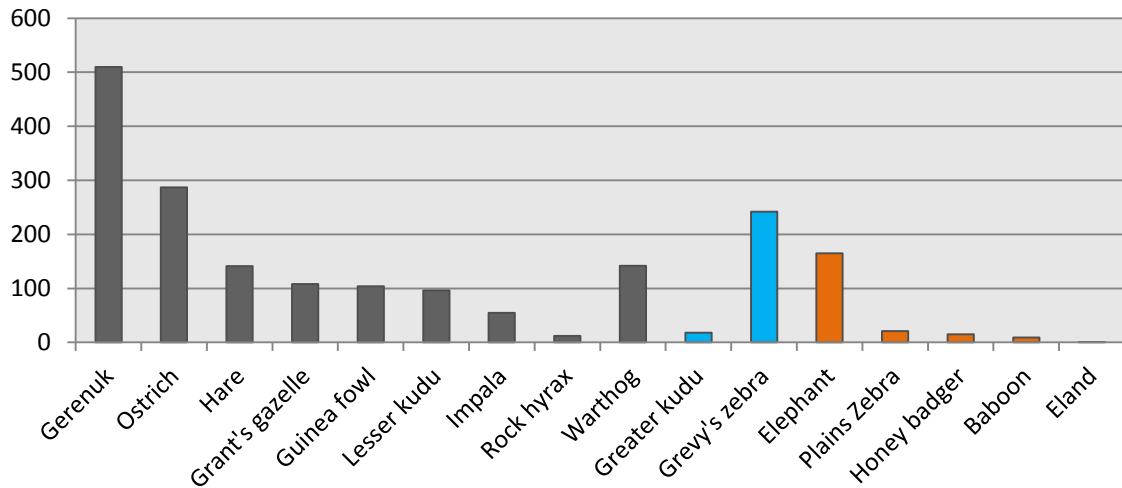
Figure 9 - Cheetah and other predators in the southern section of the Meibae Conservancy as recorded by ACK Field Officer patrols. While jackal and hyena are the most common predator recorded, the leopard and cheetah are also regularly sighted and tracks can often be found. The map shows that all predators are seen in similar areas and that ACK data is similar to that of the Meibae rangers for cheetah locations. Since there are nearly ten times the number of Meibae rangers, and the area of coverage is the entire conservancy it makes sense that the distribution of sightings covers a larger area.



Photos: Wild dog, jackal and leopard are among the predators regularly recorded.

The presence of animal species within the size range determined to be preferred cheetah prey is distributed across the entire conservancy. Dikdik and gerenuk were the most common prey species sighted on both patrol and transect exercises (Figure 11). Further assessment of walking transects using DISTANCE analysis in 2014 will produce results that can quantify the estimated biomass of cheetah prey base. Combined with scat analysis to determine the prey consumption we will be able to correlate cheetah movement with monthly, seasonal and/or pastoralist grazing changes in prey distribution and abundance to better understand the relationship of cheetahs to people in this ecosystem.

Frequency of Prey Sighting



Species	Average group size	Sighting Frequency
Preferred Cheetah Prey (Dark blue)		
Dikdik	2.5	588
Gerenuk	4	510
Ostrich	3	287
Hare	1	141
Grant's gazelle	5	108
Guinea fowl	21	104
Lesser kudu	2	96
Impala	5	55
Rock hyrax	6	12
Sometimes Cheetah Prey (Light blue)		
Warthog	5.5	142
Greater kudu	2.5	18
Seldom/Never Cheetah Prey (Orange)		
Grevy's zebra	8.5	242
Elephant	8.5	165
Common Zebra	10	21
Honey badger	1	15
Baboon	20	9



Figure 10: Cheetah and prey (preferred, sometimes, seldom) seen on ACK Field Officer patrols. Photos: Gerenuk and dikdik are among common preferred cheetah prey

PATROL SPECIES RECORDED (evidence)				TRANSECT SPECIES RECORDED			
Species	Number of occurrences	Number sighted	Average group size	Species	Number of occurrences	Number sighted	Average group size
Baboon	9	180	20	Baboon	12	207	17
Bat-eared fox	8	16	2	Camel	52	703	14
Caracal	7	7	1	Cattle	34	806	24
Cheetah	38	51	1.5	Dikdik	157	383	2
Dikdik	588	1371	2.5	Donkey	56	408	7
Eland	1	3	3	Elephant	2	7	3
Elephant	165	1426	8.5	Gerenuk	83	372	4
Gerenuk	510	2048	4	Grant's gazelle	12	60	5
Grant's gazelle	108	507	5	Grevy's zebra	49	449	9
Greater kudu	18	48	2.5	Guinea fowl	17	379	25
Grevy's zebra	242	2001	8.5	Hare	39	42	1
Guinea fowl	104	2204	21	Impala	1	8	8
Hare	141	170	1	Jackal	10	14	1
Honey badger	15	15	1	Kori bustard	2	2	1
Hyena	185	188	1	Lesser kudu	7	10	1
Impala	55	285	5	Ostrich	48	131	3
Jackal	184	266	1.5	Plains zebra	1	6	6
Kori bustard	2	2	1	Shoat	131	7524	57
Leopard	40	39	1	Warthog	15	94	6
Lesser kudu	96	226	2				
Ostrich	287	812	3				
Plains zebra	21	201	10				
Rock hyrax	12	68	6				
Warthog	142	799	5.5				
Wild dog	12	56	5				



Figure 11 - Tables show the number of recorded occurrences (track or sighting) for each species on patrols and transects (sighting only). Patrols record predator tracks (spoor) or sightings as an occurrence documenting the presence of the species while on transects prey species are only documented when they are seen. On transects we are also monitoring the presence of domestic stock (cattle, camel donkey, and shoat (goat/sheep mixed together), since the grazing in the area also has an effect on the ability to document predators. **Photo:** Samburu ACK staff collecting data

Faecal Collection and Analysis

The faecal project analysis for scats collected in 2012 had some minor setbacks towards the end of 2012 when permit issues for export were not granted for the hormone study and when advisors on the hair analysis requested DNA studies to be a part of the final study. New goals were set for the project that could work within our budget and could be conducted fully within Kenya. Noreen Mutoro from the University of Nairobi took over the faecal project for her Master's project. Noreen proposed four objectives: 1) to determine if the faecal material belongs to cheetah by looking at the presence of cheetah hair in the sample; 2) to assess the available cheetah habitat types and their ecological conditions in Salama and Kapiti areas; 3) To assess the actual and potentially available prey for cheetahs in the study areas; 4) to determine the frequency of occurrence of different prey species and their importance in the cheetah diet; and, 5) to evaluate habitat selection of defecation and known cheetah sightings. To date, no article on cheetah scat analysis tests the ability to confirm scat as originating from cheetah through the hair in the scat. Additionally, several researchers affiliated with KWS have performed scat analysis to determine various predators' prey selection, but to date; no project provided a comprehensive chart of wildlife hair that can be used by other researchers. This means that each researcher has to collect hair from every potential animal in the study scope and organize a chart of the hair shafts and scale patterns that will allow the scat analysis to proceed. Working with KWS, the National Museums of Kenya (NMK), Yumi Yamane (leopard researcher in the Nairobi National Park) and collected hairs from domestic animals in our Salama study area, we were able to create a photo catalogue of all potential predators and prey (50 species). This catalogue will be shared with other predator researchers and given in full to KWS and NMK.



Photo: *Noreen Mutoro, Deanna Russell and Viola Ruto collecting, organizing and analysing scat.*

In her original thesis proposal, Noreen's study proposed to incorporate an aspect of scat searching to include a faecal detection dog. In addition, she was to test the efficiency of collection using a dog in 2013 vs. not using a dog in 2012. Deanna Russell worked with ACK for five months to learn the skills needed to effectively train and handle a scat detection dog. Deanna worked in affiliation with KK Security in Nairobi and consulted with Working Dogs for Conservation in the US. After several months of searching for the right dog, we were given a dog named Mara on loan from Canine Specialties out of Tanzania. After nearly two months of training with KK Security dog handlers, Deanna and Mara spent two weeks in the field. Mara joined the ACK staff in the field in July and proved that she was ready for formal field work; however, on a training session after finding her target, Mara fell into a hole while chasing her reward toy. Mara was severely injured in the fall and was taken to Yoanni Yapperville veterinarian Anita Stanley. Physical therapy, anti-inflammatory and pain medications were administered for over a week with no substantial results. X-rays confirmed

that Mara had severe damage to her spinal cord and even if she were someday able to walk again, she would never be able to run or work. Mara's drive for the toys she loved was so strong that her owner and Dr Stanley made the decision that for her own well-being, Mara needed to be euthanized. This was a tough decision for everyone and was devastating to those of us who grew to love Mara. Mara taught us what a good detection dog could do, and despite the hole she left in our hearts, she made us determined to continue with this work. Our sincere apologies and condolences to Canine Specialties for the loss of this amazing dog.

Photo: Mara was trained to seek, find, and sit when she located cheetah scat. Her reward was a Kong® toy thrown and played with. Scat is bagged and tagged.



Camera Trapping and bait study results

Erica Hermsen completed her Master's degree and graduated from Antioch University New England based on the evaluation of bait for attracting cheetah. Although her study was conducted in 2012, the final results were not released until March of 2013. Out of six bait types (three scents, the live goat, the robotic goat and a small moving decoy), the robotic goat showed the highest potential in luring wild cheetahs to traps.

The live goat proved to have the least potential in luring cheetahs due to disturbance by other carnivores. Although scent lures showed high potential in captive cheetah tests (Figure 12), the scent lures in the field tests gave poor results for potential cheetah attractants (Figure 13).

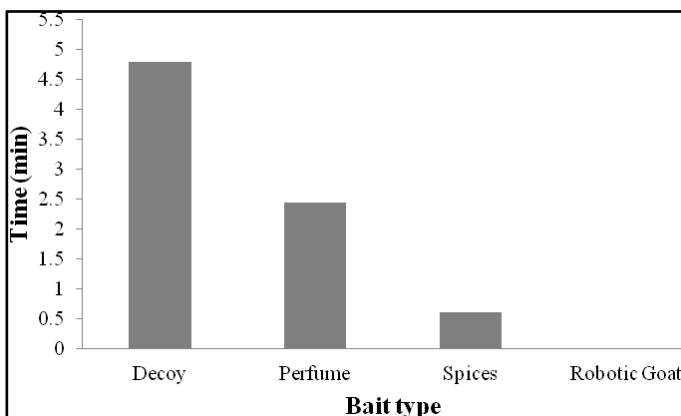


Figure 12: Captive cheetahs showed the most interest in the FoxPro decoy and perfume while giving no attention to the robotic goat.

Typically, a live goat has been used by cheetah researchers in southern Africa to lure cheetahs into traps for relocation or for radio collar studies. We found that live goats were attracting a high number of jackal and hyena in addition to being tampered with by people in the Salama and Meibae study sites. In a search for alternatives, the robotic goat concept was developed and used in tests conducted by Erica. Although cheetahs did come to the live goat twice (same cheetahs at a time interval long enough to count as two trap events), the lack of other predators coming to the robotic goat indicates that there is a higher potential for us to trap cheetahs using the robotic goat. The jackal visited the robotic goat for the greatest total amount of time during the study, which could still cause some problems if the jackal steps through the trap before the cheetah arrives. Further tests and different prototypes of the robotic goat are planned prior to radio collaring attempts. As the new ACK Volunteer and Outreach Coordinator, Erica will be advising new students in further studies for the census and collaring of cheetahs in Kenya.

Bait Type	Cheetah Trap Events	Non-Target Species Trap Events	Trap Events (%)
Bedding	0	105	36
Custom Scent	0	37	13
Decoy	0	35	12
Live goat	2	48	17
Perfume	0	45	15
Robotic goat	1	19	7
Total	3	289	100



Figure 13: The number of Cheetah Trap Events and Non-Target Species Trap Events along with percentage of total Trap Events among bait types.

Injured, Orphaned and Trans-located Cheetahs

Current studies in southern Africa evaluate the potential return of wild-born orphan cheetahs into the wild. These experiments have been met with little success, usually resulting in the early death of the cheetah or return to captivity. In Kenya, orphan cheetahs at the KWS orphanage come from those collected by individuals or confiscated by KWS. It is the policy of KWS to treat injured cheetahs when possible and to raise any orphan cheetah at the KWS facility in Nairobi where caretakers have the most experience. In line with the inability of other programmes to return hand raised cubs into the wild, it is also the policy that the cubs are raised with human care and it is not attempted to keep wild nature in the cub's behavior. In recent years, ACK has been working with KWS to address the issue of orphan cubs and the difficulties in both keeping the cheetahs in captivity and in the development of a cheetah sanctuary or a programme for re-wilding cheetahs.



Photos: *The weak and frightened cub was taken to the Meibae HQ while rangers and herders searched for its family. Although she gained strength in the first two weeks the mass in her heart was likely the reason the mother abandoned her and moved away with the stronger cubs. Calabash was cared for by the nursery staff at KWS until her passing.*

In April 2013, we had the unfortunate situation where a cheetah cub was removed from the wild by a Samburu herder who found the cub alone for two days. The mother cheetah had been reported by several herders in the previous week with three cubs in an area where livestock were being grazed extensively; however, after the herder found the lone cub with no sign of the mother, he picked her up and took her to his manyatta (homestead). The herder tied the cub to a tree during the day and brought it into the manyatta at night, he fed the cub dried meat that his dogs are also fed. A neighbor heard about the cub and found that it was weak, so he contacted the Meibae Conservancy ranger headquarters where ACK Cheetah Field Officers were holding a staff meeting. The rangers asked ACK to accompany them to evaluate the status of the cub and to advise on its future. When we arrived the herder took us to the tree where a cub of about five weeks was laying. When approached, the cub had enough energy to pull to the end of the leash where it flopped around trying to free itself and growled at the crowd of people. I picked up the cub by the scruff of its neck and calmed it down by soft talking and stroking it. The rangers and cheetah officers accompanied the man to the location where the cub was picked and found the area very disturbed by goats. The only predator tracks were hyena; there were no signs of the mother and her other cubs. We agreed to take the cub for the night to try to hydrate it, and to return in the morning to search for the mother before the goats began to graze. Through the night I set an alarm for every hour to wake and provide the cub with fluids - I was able to get some fresh milk and glucose that I mixed with warm water. Although the cub would put its face into the liquid, it would inhale as it tried to drink, so I took a latex glove from my first aid kit and made a hole in the end of one fingers. Once the cub figured out that it could suckle from the glove and it gained some strength, it became very aggressive in its nursing. It was hard to keep the cub from tearing the glove and my hands. For three days the rangers, Cheetah Field Officers and community members searched an area of 5 km around the location where the cub was taken, but there were no signs of the mother and siblings. During the three day search we were in constant communication with the area KWS veterinarian and the conservancy manager. Because of the lack of proper resources to care for the cub and the inability to find the mother, the decision was made to take the cub into Nairobi to be raised at the orphanage. Although she seemed to be getting stronger, she was not eating well and her system was not functioning well. About three weeks after we brought her in we received word that she had died and the necropsy revealed a mass on her heart and lungs - it now made sense to why the mother had abandoned the cub and reminds us that nature has its own way of dealing with the ones that are not healthy. We have taken this opportunity to discuss with the community the need to leave baby animals alone, not to pick them up and to call the Meibae rangers immediately to let them make decisions on wildlife issues with consultation of KWS. This little cub touched many hearts in her short time with us, but we recognize that we must let nature run its own course.

In June, there were two injured cheetahs in our study sites. In Salama, near the turn to Game Ranching a cheetah was hit by car and seen in the ditch by a worker from the Small World restaurant. KWS officers and the veterinary team picked up the cheetah and took it to Nairobi. The cheetah was the third cheetah since February to be hit by a car along a 50km stretch on Mombasa highway. The other injured cheetah was from the Buffalo Springs Reserve. A group of cheetahs were seen hunting a zebra and one young male was kicked. After two days of limping he was seen again by the rangers who contacted KWS for assistance. The KWS found the cheetah badly injured with multiple fractures. Both cheetahs were treated by KWS and the University of Nairobi Veterinary facility to repair the injuries although the prognosis for full recovery was negative. Pins and plates were successfully put into the injured areas, but both cheetahs ended up dying within a month of the treatment. In both cases the cheetahs had undergone a lot of trauma leading up the surgery, and the likelihood of rehabilitation was slim. Decision to treat the injuries was based on the possibility that recovery and rehabilitation could be attempted. It is a difficult decision to make when knowing that a full recovery is highly unlikely, the surgery is stressful, expensive and difficult vs euthanasia of an animal knowing that it will never be wild again. I am grateful to KWS, and to the veterinarians that assisted with the procedures.



Photos: *The injured cheetah from Samburu was taken to KWS for treatment but did not survive the treatment. The Athi-Kapiti cubs remained in the wild with their mother and once they were older, followed their mother into the bush*



During Athi-Kapiti game counts in November we received word of cubs born in a field belonging to Small World Restaurant along the Game Ranching boundary. Herders had been frightened by the growling mother and requested KWS to trap and remove the family. However, the cheetahs were not killing livestock, and the mother ran away when the herders approached the cubs. After several consultations with Small World management and herders, they agreed to let the cheetah raise her cubs on the property and they let KWS know that they did not want the cheetah to be removed. With fewer than 1400 cheetahs remaining in all of Kenya, it is likely that there are less than 200 females giving birth at any given time. Small World allowed the mother to raise her cubs undisturbed, and as soon as they were old enough to walk with her the family moved into Game Ranching and Kapiti Estate where they were still being reported at the end of the year.

In March and in September there were press reports of cheetahs being captured live by herders in Wajir County after goats were killed by the cheetahs. In November, a cheetah was caught by herders in Garissa with her four cubs after she had killed goats. All of these cheetahs were turned over to KWS and were trans-located to a new location in various parts of the country after treatment for capture injuries. Without a monitoring system (radio collar) in place it is highly unlikely that the cheetahs would survive being moved into unfamiliar territories of other predators. Cheetahs spend their sub-adult lives learning to move in an area to search for food, water and security. A cheetah that is a problem in one area where it learns to take goats will likely go for goats again as it searches for its territory among the threats of the new area. Essentially moving a problem animal from one area to another is only shifting the problem and likely causes great suffering to the captured animal.

ACK is addressing this issue in several ways:

- 1 - Creating awareness material and conducting training for rangers on discussions with herders and land owners on the threats and status of cheetahs;
- 2- Holding meetings with KWS management to identify potential translocation and monitoring sites when occurrences of captured cheetahs are presented;
- 3 - Working with communities and political officials in Wajir County to develop a conservation area, carnivore monitoring and training for awareness of cheetahs and other predators in the region - including conflict mitigation and community natural resource management.

Capacity Building

ACK staff (Mary and Cosmas) were trained in 2012 to conduct project planning seminars using Miradi software through the Conservation Measures Partnership. We used these skills to conduct additional training with our Salama field staff and to set research goals and objectives for the project. Once we all felt comfortable with the process, we organized a stakeholders meeting with ministry offices, KWS and community representatives. Through the first planning session we have secured funding to conduct additional planning seminars within several of the areas to develop a comprehensive natural resource plan. We are grateful to Eco-Sys Action for their support in this endeavour. The meetings have been scheduled for June 2014 with the hope that public officials will be settled into their new roles under the changed local administration.

Planning in the Samburu region will also begin in 2014. Following the first stakeholder meeting in 2013, we have identified the conservation stakeholders and the administrative stakeholders. Through the Meibae Conservancy we will identify the community stakeholders and begin meetings in the early part of 2014. We will meet with the community members, the board and the other stakeholders to plan and conduct planning workshops using the Miradi process.

ACK accepts volunteers and students on attachment for internships and thesis projects. In 2013, Deanna Russell volunteered for five months to assist in processing the faecal material collected in 2012 and to be the trainer for the detection dog project. Deanna gained experience in research and project management during her eight months with ACK. As previously discussed Noreen Mutoro joined our team from the University of Nairobi to complete the cheetah faecal analysis as a part of her Master of Science degree. Noreen's advisor is Dr. Nicholas Gichuki. Viola Rono worked with Noreen in the KWS laboratory to set up the cheetah scat hair analysis project. Viola has an undergraduate degree from the University of Nairobi and certifications in molecular analysis.

Viola would like to improve her skills in molecular biology and return to University to specialize in hormone and genetic studies. She will continue to assist in faecal analysis in 2014. Noreen and Viola are providing us with the base for faecal collection and analysis to map cheetah prey selection, cheetah stress hormones and DNA throughout Kenya using the methods developed in Noreen's Masters study.



Photos: Volunteer Casey Huck and Journalist Marcy Mendelson set up cameras, visit schools and visit the community cattle dips.

We hosted Adrian Cerezo from the St Louis Zoo who was visiting East Africa on several projects in February. Adrian and his friend Maureen joined ACK for game counts, assisted with education material development and attended the Machakos Farmers Training event. Three international volunteers joined ACK for two week projects. Yvonne Santiago, from Puerto Rico, assisted in re-designing of the ACK website (www.actionforcheetahs.org) and Richard Proudlove, from Australia, assisted with design of the cheetah craft project business plan in June. Elizabeth Sloane spent a week with the Wana Duma Children’s Project and a week with ACK assisting with game counts. Casey Huck joined ACK for six weeks as a student intern from Antioch University New England. Casey tested methods to conduct transect surveys to determine density and abundance of predators using recorded areas of preference for predators from our faecal studies and previous camera trapping projects. Casey assisted with the Machakos Agriculture Fair and also assisted with game counts and data entry. She returned to complete her studies with a greater knowledge of field work requirements and project management skills.

In April, Mary Wykstra attended the Pan African Association of Aquariums, Zoos, and Botanical gardens (PAAZAB) in Cape Town, South Africa. Mary presented a paper on the “*Pro’s and Con’s of Social Media*” discussing the benefits of social media in project development and the strategies of surviving a social media attack. Mary visited Cheetah Outreach after the conference to discuss the role of ambassador cheetahs in education and the successes of the programmes implemented through partnership with Cheetah Outreach and the Endangered Wildlife Trust.

From July through October, Mary was in the US to attend the Zoo’s and Aquarium’s Committing to Conservation bi-annual meeting and the American Association of Zoo Keepers and Association of Zoos and Aquariums annual conferences. Mary gave presentations at eight venues and delivered COOL Craft products to an additional four venues. Erica Hermsen, Holly Koppleberger and Phyllis Davis assisted at the venues to promote ACK and COOL Craft programmes. New venues this year were in Seattle in a joint fundraiser with presentations by the Wana Duma Children’s Project, the Wild Felid Advocacy Center of Washington, and the Sequoia Park Zoo. Mary joined Project Survival at a fundraiser for the Snow Leopard Conservancy where new partnerships were formed with SLC supporters to test predator deterrent lighting systems developed in the US compared to systems that are being fabricated, installed and tested in Kenya.

Community

Some aspects of our community projects have already been discussed in the Research and Capacity Building portions of this report. Community meetings (baraza) are our best source of interaction with the community. During the meetings our entire staff show support for the one who is in charge of the area in which the baraza is being conducted. The ACK Field Officer sets the agenda for discussion, and introduces the local administration, Kenya Wildlife Service representative and other ACK members to share information about conservation in the region. The theme for this year's baraza was "Boma Days" whereby models of predator-proof livestock corrals (boma) and discussions about herding practices are presented. This year, ACK participated in two agriculture shows to share study results and discuss predator loss prevention methods with a greater farming community in the Machakos District. The first was hosted by the Machakos Farmers Training Institute and was themed "Technology Solutions" held in February. ACK set up a display of cheetah information and our boma models. We shared space with KWS and with Green Rural Africa Development (GRAD), thus the visitors to the booth could see the collaboration between our programmes while also learning about the parks, community relations and human-wildlife conflict mitigation efforts. GRAD uses solar technology with lights set on a flashing unit to prevent predators from attacking livestock at night. ACK works with GRAD in the Salama and the Samburu ecosystem to test the technology and to assist in finding alternative loss prevention methods.

The second event was the Machakos Agriculture Fair which is held annually in June. ACK again shared space with KWS and set up a complimentary display of cheetah information and boma models. The booth space was given three first prizes for the quality, content and professionalism of our display. ACK produced posters and hand-outs about the predators (cheetah, leopard, serval, hyena, lion, jackal) that complimented the boma materials and the KWS materials. The two show audiences tallied over 5,000 people.



Photos: Agriculture shows, community conservation events and awareness marches are among the activities that ACK staff participate.

ACK attended the Northern Rangelands Trust (NRT) community conservation celebration in February to share in the success of linked community conservation efforts. The Meibae Conservancy as a part of NRT has support through ranger training and community conservation seminars. NRT and the Grevy's Zebra Trust (GZT) support holistic rangeland management projects that aid the community in improved grazing and water management. ACK links into the ongoing work through sharing of data and participation in events and community seminars as well as through developing materials for distribution. ACK officers also worked with GRAD to install a predator deterrent lighting system and discussed linked programmes to prevent predator attacks on livestock holding areas. Tests using camera traps are scheduled to start in the coming months. Through links with NRT and GZT along with other programmes in water management, bush clearing and conflict mitigation we hope to assist the Wajir South Member of Parliament in achieving his goal of forming a conservancy in the Wajir County using cheetahs as the icon representing the community conservation efforts.

ACK continues to work with the Kiima-Kiu Secondary School with water improvements (through joint work with the Kalamazoo Christian High School). A water collection tank was installed at a new girls dormitory and a second school visit by Kalamazoo students is being planned for 2014. ACK will be conducting some field work training with the Kiima-Kiu wildlife club students who will then teach the Kalamazoo students about wildlife monitoring and data collection.

PLANNED ACTIVITIES –2014

The following goals will be achieved by ACK in 2014. Links with the Mara and Meru and Athi-Kapiti area researchers will allow comparisons to cheetahs in other regions of Kenya, and will enable pilot projects to be used to launch into a national survey (2014-2017). To improve our effectiveness in data collection and analysis, we are seeking grants for smart phones and a digital data base through iNaturalist and Wild Knowledge to make our project paperless and to allow all data to be collected and stored digitally by all staff.

Goal 1: Identify factors affecting cheetah livestock predation and mitigate conflict.

a. Prey Distribution and Abundance:

- The monthly walking and driving transects completed from 2007 - 2013 in the Salama area will be analysed for publication on prey distribution, density and abundance changes over the course of the area development. Density and abundance will be calculated with DISTANCE software;
- Transects in the Samburu area follow methods developed in Salama. 2013 data analysis will compare cheetah prey distribution across habitat types in the Samburu and to that in Salama. This will set the baseline for the area and for trend analysis in the Samburu ecosystem;
- Prey selection determined through faecal hair analysis will provide insights into the adaptations of the cheetah to human settlement as well as the level of domestic stock consumed by the cheetahs. Continued faecal programmes will be developed with the University of Nairobi partnership.

b. Human Settlement Pattern:

- Use of satellite images to map changes in land-use, natural resources and settlement areas in the Salama and Samburu study sites;
- Complete publications of changes in land use and the effects of conservation in the Salama area;
- Analyse changes in land use in Samburu and effects on wildlife distribution.

c. Evaluate Livestock Depredation:

- Under the new Kenya Wildlife Act conflicts are investigated for purposes of compensation. We have discontinued conflict investigation in the Salama area and are focused on conflict prevention through increased herder training and through predator deterrent light testing;
- In 2014, the Samburu staff will collect baseline data on livestock losses reported as cheetah depredation. We are also testing predator deterrent lights in areas of high hyena conflict, and reflective tape in areas of high jackal conflict;
- Conduct follow-up interviews with 250 farmers/herders to evaluate effectiveness of ACK mitigation efforts in the Salama area (proposed student project);
- Partnering with Savannah Tracking, GRAD and Ewaso Lions to develop an early alert system for areas of problem predators that will include community WIFI and motion sensor activation.

Goal 2) Understand cheetah health and habitat selection

a. Monitor cheetah presence and movements through observation:

- ACK field officers will continue to collect sighting and track information through personal observations and follow-up on reported sightings;
- Test transect camera trapping in Salama and Samburu study areas;
- We will continue to develop and test cheetah bait for collaring and monitoring particular cheetahs;

- We will begin the process of setting priorities and developing partnerships for a second national survey currently planned to launch in late 2015 or early 2016.

b. Determine habitat use of cheetahs in relation to vegetation and prey:

- Use satellite images to overlay vegetation and prey distribution with cheetah sightings, spoor and scat data;
- Train and utilize scat detection dog in addition to staff searches for scat samples.

c. Use scat analysis to understand cheetah adaptations to land-use changes

- Complete Salama and Athi-Kapiti scat analysis positively determine cheetah prey selection and frequency of domestic stock in cheetah diet;
- Collect cheetah scat from the Samburu study site to compare prey selection to the Salama and Athi-Kapiti sites;
- Develop glucocorticoid, DNA and disease/parasite protocols and establish laboratory relationships for pilot programs in collaboration with other predator projects in Kenya.

Goal 3: Influence public and administrative changes to positively affect cheetah conservation and management protocols.

a. Extend ACK programmes into Wajir County and into the Galana Conservancy through strengthened partnerships with area programmes and administrative partnerships.

b. Conduct community programs to disseminate findings, promote conservation awareness, and improve livestock management techniques:

- continue monthly Community meetings (baraza) to promote improved livestock management and share conflict mitigation ideas with KWS and local administration;
- Present community members with "Conservation Hero" certificates;
- Develop herder training programme for Salama and Samburu study areas.

c. Raise environmental awareness through partnerships and internal education programmes for communities and schools:

- Hire two education officers to develop school and community programmes including effectiveness monitoring (funding dependent);
- Develop teacher resources and student activity books;
- Disseminate posters and awareness materials developed in 2012;
- ACK participates in the Conservation Measures Partnership (CMP) to provide focus on issues of environment and social responsibility and allow us to measure our effectiveness in achieving our goals;
- Continue to develop projects in bee keeping, livestock management, community crafts and natural resource management as they are a strong aspect of ACK work within the ecosystem.

d. Establish cheetah conservation protocol and the policy in collaboration with KWS and local stakeholders:

- Provide quarterly updates to KWS and present our research findings at an annual Carnivore Action Forum meeting;
- Participate in updating National and Regional Wild Dog and Cheetah Strategic Plans to assist in the framework of cheetah conservation on a regional scale;
- Produce printed materials and digital submissions through our web site to improve awareness of activities and findings;
- Use past data (2004-2012) to produce scientific publications;
- Complete plans and submit grant proposals for a second National Cheetah Survey in collaboration with KWS and other carnivore projects.

STAFF

PI. Mary Wykstra, MEM, ACK Director

Since 2001, Mary has managed ACK, leading research and community development activities and acting as liaison to ACK partners. She holds a Master's of Environmental Management (2011) from Yale University, focusing on range-wide cheetah management planning and population dynamics. Mary's authorization is through the Kenya Ministry of Science and Technology in affiliation with the Kenya Wildlife Service (KWS) and Cheetah Conservation Fund (CCF).

Cosmas Wambua, M.Sc., ACK Research Scientist

Cosmas has been the ACK research scientist since 2002. His experience in ecological monitoring began with KWS in 2001. He holds an MSc (2008) from Addis Ababa University in Ecological and Systematic Zoology.. Cosmas maintains the ACK database, develops research methods and supervises staff/students for consistency in data collection.

Erica Hermsen, M.Sc. – ACK Outreach and Volunteer Coordinator

Erica conducted research for her Master's thesis with ACK in 2012. After completing her field work, she continued to assist ACK through communication with volunteers and student affiliates. Erica is volunteering her time to assist ACK in website management, outreach and fundraising. To support Conservation Erica has launched an adventure service company - check out her programme Miradi Wild.

Lumumba Mutiso – Community Field Officer, Salama

Lumumba coordinates ACK community activities and field data collection in the Salama area. Lumumba is a small-scale farmer who was born and raised in the Kiu/Salama area. In 2008 Lumumba attended training courses in Namibia in Integrated Livestock and Wildlife Management and in Cheetah Conservation Biology.

Chris Simon Lentaam, ACK Community Field Officer, Samburu

Lentaam coordinates ACK activities in the Samburu region. He 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 participated in Human-Wildlife Conflict mitigation training in 2012.

Pius Wamunyu, Jimmy Muli– Community Cheetah Scouts and Field Assistants (Salama)

Souhl Lemuntere and Moses Kinosi – Community Cheetah Scouts and Field Assistants (Meibae)

Ken Ochieng– Housekeeping Nairobi

BUDGET

Income: 2013 financial supporters include private donations, Cheetah Conservation Fund, Utah Zoological Society, Utah's Hogle Zoo, Cleveland Zoological Society, Cleveland Metroparks Zoo, St. Louis Zoo Field Conservation and Research Grants, AAZK Bowling for Rhinos, Disney Worldwide Conservation Fund, Fresno Chaffee Zoo, Columbus Zoo, Oregon Zoo, Birmingham Zoo, Baton Rouge Zoo, Project Survival - Cat Haven, Animal Ark, Binder Park Zoo, Eco-Sys Action, and Classic Escapes Safari. Additional income is received from craft sales, speaking stipends, volunteer fees and rent sharing.

Current affiliated organizations include the Kenya Wildlife Service, University of Nairobi, African Wildlife Foundation, Cheetah Conservation Fund, Mara-Meru Cheetah Project, Ewaso Lions Project, Smithsonian Conservation Biology Institute and Northern Rangelands Trust.

GOVERNANCE

Action for Cheetahs in Kenya is governed by a registered company limited by guarantee - Carnivores, Livelihoods and Landscapes (CaLL). Each researcher working with ACK is affiliated with the Kenya Wildlife Service (KWS) and Cheetah Conservation Fund (CCF). The objectives and direction of research and community programmes for ACK are guided by a board of directors, and research methods are approved by a scientific advisory board. ACK research assistants and field officers are employed by CaLL to conduct duties in accordance with the objectives of CaLL and to achieve results through monitored reports and newsletters.

BOARD OF DIRECTORS:

Prof William Ogara, University of Nairobi (Chairman)
Mordecai Ogada, PhD, Laikipia Wildlife Forum (Treasurer)
Mary Wykstra, MEM, Action for Cheetahs in Kenya (Secretary)
Erica Hermesen, MSc, Miradi Wild, LLC and CB&I Environmental, Inc.
Peter Barber, Independent consultant

SCIENTIFIC ADVISORS:

Prof. Nick Oguge, University of Nairobi
Samuel Andanje, PhD, Kenya Wildlife Service
Laurie Marker, D. Phil, Cheetah Conservation Fund
Anne Schmidt-Küntzel, PhD, Cheetah Conservation Fund
Adrienne Crosier, PhD, Smithsonian Conservation Biology Institute
Darcy Ogada, PhD, Nature Kenya and the Peregrine Fund, Museums of Kenya

BIBLIOGRAPHY

Durant, S., L. Marker, et al. (2008). An Analysis of Mammals on the 2008 IUCN Red List. Gland, IUCN, Conservation International, Arizona State University, Texas A&M University, University of Rome, University of Virginia, Zoological Society London
IUCN/SSC (2007). Regional conservation strategy for the cheetah and African wild dog in Eastern Africa. S. Durant and R. Woodroffe. Gland, Switzerland, IUCN/SSC.
KWS (2010). Kenya National Strategy for the Conservation of Cheetahs and Wild Dogs. Research. Nairobi, Kenya Wildlife Service.