## Mara Lion Project Kenya Wildlife Trust

2016 Annual Report





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### Meet the Team

### **Dr. Nic Elliot - Project Director**



research and conservation efforts on dispersing males. In 2007 he joined the University of Oxford's WildCRU and returned to his native Zimbabwe to conduct a PhD on the ecology of dispersal in lions which he completed in 2013.

### Niels Mogensen - Chief Project Officer

Niels conducted a BSc. in Biology at the University of In 2007 Dominic was enrolled in the Koiyaki Guiding



Aarhus and later transferred to the Department of Behavioural Biology at the University of Copenhagen for his MSc. His fieldwork focused on how the Maasai and their livestock affected lion behaviour.

### Kelvin Koinet - Research Assistant

Kelvin joined the project at the beginning of 2016. In early 2016 we launched the holistic assessor pro-



For the past seven years he worked with SORALO, in his later years, running a team of Resource Assessors. He is currently undertaking a Bachelors degree through correspondence at the University of Nairobi.

### Michael Kaelo - Chief Community Officer

Nic has worked with lions since 2007, focusing his In 2005 Michael joined Kenyatta University for a BSc.



in Environmental Studies and Community Development. In January 2012 Michael started an M.A in Environmental Planning and Management at the University of Nairobi after which Michael joined the Mara Lion Project.

### **Dominic Sakat - Community Liaison Officer**



School, where he attained his bronze KSPGA guiding certificate. Since August 2011 Dominic has been working in the communities of the Mara in an effort to mitigate against human-lion conflict.

### Holistic Assessor team



gramme. We employed five people (seen together with Dominic Sakat) to work within their home areas on issues relating to humanwildlife conflicts. All five are based in the Pardamat area.

### **Julius Makibior - Mechanic**



trained automotive technician with over 20 years of experience in vehicle maintenance. Julius is in charge of all the project vehicles and the maintenance of the Tony Lapham Predator Hub and is therefore crucial to the team.

### Kolua Kikanae



Kolua is a student at the Maasai Mara University. He completed a formal internship with the Mara Lion Project in 2015. Kolua's dedication and passion for conservation saw him join us for a second time during his holidays in 2016.

### Billy Kaitet—Caretaker and chef

Julius was born in Kakimirai, Bomet County. He is a Billy was born and brought up in Naroosura in Narok



County. He trained as a room steward, laundry service and maintenance person. Billy joined the project in April 2016 as a chef and caretaker. He also helps Julius in the day to day activities at Tony Lapham Predator Hub.



### **Executive Summary**

The year 2016 was busy and productive. Among the achievements of the Mara Lion Project this year, four in particular stand out: (1) late last year we published a scientific paper on lion numbers within the Masai Mara National Reserve and surrounding conservancies. With the assistance of Dr. Arjun Gopalaswamy we developed a new methodology for accurately assessing lion numbers. Establishing lion numbers and monitoring trends was one of the primary reasons the project was initiated so it is with great pleasure that we have provided a robust estimate of 420 lions over the age of 1 year (pg. 6); (2) towards the end of last year we collaboratively organized a workshop on Rapid Response to Wildlife Poisoning. Recognising the significant threat posed by poison, we teamed up with the Peregrine Fund,

### **Our Approach**

The approach of the Mara Lion Project is to conduct interdisciplinary scientific research in order to identify and implement sustainable solutions to conservation issues. We use a mixture of natural and social sciences to acquire a holistic overview of the entire ecosystem and identify areas of concern, not only for lions and the community, but for the ecosystem more generally. For conservation actions to be sucNature Kenya and Birdlife International to coordinate a 2 day workshop which was a great success (pg. 29); (3) we got our collars for conservation programme firmly underway, with five collars deployed on sub-adult males. The data is showing great promise and we look forwards to producing a connectivity analysis later this year that will help to guide corridor placement and potential new conservancies (pg. 14); (4) We started our Holistic Assessment Programme in five zones within the community that are crucial to wildlife in general and lions in particular (pg. 32).

Both lion surveys for the year successfully completed. Furthermore, a multitude of activities saw us engage with stakeholders, from community members to government officials, in a variety of forums.

cessful, it is essential that the local community is committed to achieving the same goals. Our community engagement programme has three distinct elements: consultation with the community to identify areas of concern related to human-wildlife conflict; mitigation of humanwildlife conflict using sustainable solutions as identified by the community; and resource management and community awareness programmes, aimed at engaging the community so as to promote human-wildlife coexistence.

### **Our Mission**

### To enable viable predator populations within Greater Mara Ecosystem

We believe this can be achieved by ensuring that key stakeholders consistently use sound scientific recommendations based on the following key objectives of the Mara Lion Project:

- 1. Develop and implement robust population monitoring
- 2. Quantify threats to lions
- 3. Provide information for evidence-based policy and management decisions
- 4. Engage with the local community to improve tolerance of lions

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### Lion Numbers

Accurate assessment of population density is notoriously difficult for large predators. However, accurate figures are essential to conservation and thus we invest a great deal of effort in lion monitoring. Rather than use traditional, and imprecise methods, we used cutting edge methodology to analyse a 3-month survey of lions over the age of one. The initial baseline survey was conducted in late 2014. Overall lion density was estimated at 16.85 lions per 100km2 over the age of one year. This translates to 420 lions within the study area with a sex ratio of 2.2Q:1 $^{\circ}$ . The lion survey has been published in the journal Conservation Biology.

All of our density surveys are conduct-

ed within a spatially-explicit capture recapture framework. Apart from being a robust method to estimate density, the real power of the method is that it is spatially-explicit. This means that not only can we accurately estimate density, but we can also estimate density per area. In other words, we can provide a 'heatmap' of lion density. With more time and data, we will be able to explore survival and mortality at such a fine spatial scale. This will allow us to identify and quantify key threats facing lions. For example, we may find that where human density is high, lion density is low. Indeed, any spatial data can be related to density in order to assess the level of influence.

Abundance and density estimates split according to protected areas					
	Posterior	Posterior		Posterior	
	mean abun-	standard devi-	Posterior	standard devi-	
Protected Area	dance	ation	mean density	ation	
Lemek	9.5	2.8	15.3	4.5	
MMNR	179.2	15.0	17.1	1.4	
MNC	60.6	7.8	17.6	2.3	
Triangle	68.4	8.8	14.4	1.8	
Naboisho	32.5	4.2	15.5	2.0	
OlChorro	10.9	2.9	20.4	5.5	
OlKinyei	12.4	2.4	19.5	3.8	
ОМС	44.9	3.5	32.4	2.5	
All Conserv- ancies	170.9	12.4	19.6	1.4	
MMNR & Tri- angle	247.6	20.0	16.2	1.3	
Entire Study Area	418.5	28.6			

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approach estimates density at a very fine scale and therefore provide a 'heatmap' of high and low lion density.

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### **Differences in lion density**

The map on the previous page highlights that lions are not equally distributed across the landscape. Indeed, there are large seas of blue (low density) and yellow (medium density). The reasons for this will be scientifically explored in the coming year, but for now, they will be speculated:

### Human disturbance

Lions are susceptible to human disturbance, and as human numbers rise (particularly outside protected areas) lions will disappear. Within protected areas there is human disturbance in the form of (1) settlements along the boundaries, and in some cases, within protected areas. The maps below highlight the effect this could be having on lion density; (2) Access routes for livestock and vehicles. Look for example at the area along the Talek to Aitong road. This road (and subsequent settlement along it) creates an area of high disturbance and lion density is incredibly low on both sides of the road. A similar impact may be seen in time if the Sekenani road is tarred; The cores of most conservancies are better protected than the edges. For Instance, rangers may

Notice how each conservancy has a high (red) lion density at its core. As you get closer to the boundary of a conservancy (or the MMNR) the density is lower. This "edge effect" is probably indicative of human disturbance. The dots below represent human settlements, and may help to explain why lion density is high in the cores, and low on the edges. Another explanation could be that the cores are better protected from livestock incursions.



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patrol more in the core, evicting livestock, and gamedrives tend to concentrate in the cores too.

### <u>Habitat</u>

Lions tend to prefer areas with some cover. They need these areas for their cubs, for resting and for hunting. These areas should be protected for lions.

### <u>Rivers</u>

Rivers are immensely important to lions. They stash their cubs in the foliage and lie in wait for herbivores that come to access the water. It is highly likely that lion density is higher along rivers, particularly where there are many small rivers in close proximity to one another. Those rivers that are disturbed by humans are more likely to have lower lion density.

Recommendation: The cores of individual protected areas are vital to maintain lion numbers, however, the boundaries need attention for lion numbers to increase in these areas. This will also reduce humanlion conflicts

This map is a depiction of potential influence from settlements and towns. It is weighted according to the size of a town and the density of settlements. The more red an area, the higher the level of human influence (from settlements). The boundaries of the conservancies in addition to the MMNR have extensive settlements, which may result in there being low lion density on the boundaries. Notice how the two maps mirror each other.



### **Predator Indices**

Using a smartphone application we record our effort by taking a GPS point every 10 seconds. This year we spent 2380 hours in the field. At the same time we record all predators, livestock, vehicles and people. By accounting or our effort we are able to calculate indexes of abundance. The map below shows our effort during 2016—during which we drove 27,588 kms.



Every year we have two intensive monitoring sessions (below). These ninety day sessions represent a period during the Serengeti wildebeest migration and one outside the migration. A short survey period is ideal to ensure population closure. This enables us to understand population trends.



Intensive monitoring Less intensive monitoring

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The data that we collect on lions can be presented in a number of different ways. The most robust is to conduct the spatiallyexplicit capture-recapture analysis that produced the figures on pages 4-7. However, although we have yet to analyse all of our data in that manner, there is still some insight to be gleaned from the graph below. We have calculated the number of lion sightings we have recorded as a proportion of the distance driven during that period. This may provide some indication of population trend. It should be noted that this is the number of sightings, and not the number of lions.

Recommendation: In order to truly understand lion population trends, longterm and consistent monitoring is required. Wildlife populations can and do fluctuate naturally, depending on many environmental variables. It is therefore still too early to determine a true population trend, and more monitoring is required.

This has considerable financial implications and also requires continuous access to all protected areas.

We have completed 5 survey periods. Although we have not yet analysed all data, this graph provides some insight. In the first survey of 2016 (February-April) we had a dip in the number of sightings per 100 km driven. This period was characterized by particularly tall grass and so lions may have been harder to find. For this reason we need to analyse these data in the same was as presented on pgs. 6-7 to assess whether or not the population truly dipped.



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ing sessions. These maps are weighted according to the number of kilometres driven per area and the number of individuals seen.



metres driven per area and the number of individuals seen.



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### FAQs

## Which lions will be collared?

We will deploy 7 collars on sub-adult male lions still with their pride to record their dispersal

### When will this happen?

We aim to begin deploying the collars towards mid July

## Will the collar hinder the animal?

There is no evidence to suggest this. Collars are less than 1% of their bodyweight and are fitted snuggly to the neck so they don't rub

2.

3.

### Will it affect tourism?

In our experience, when the purpose of collars is explained, it adds to the visit as tourists get a sense of conservation

# **Collars for Conservation**

## **Dispersing sub-adult male lions**

### Rationale

The Mara Lion Project has been operational since 2013 and has documented 800+ lions. However, at any one time, we estimate there are around 420 lions over the age of one year. The discrepancy comes from mortality and emigration events. Of particular concern, is sub-adult lions. We have observed over 200 sub-adults dispersing from their prides, with the majority of males disappearing from the ecosystem, either dying or settling elsewhere.

### Lion dispersal

All male lions must disperse from their natal pride and establish a territory of their own, thus ensuring a constant flow of genes. In the Serengeti, adult males typically hold tenure over a pride for 2 years before being ousted by dispersing males. In the Mara, adult tenure is often over 5 years. While this may seem a success, it has led to an unusually high rate of sub-adult female dispersal (in the Serengeti only 1/3 of females disperse) coupled with inbreeding as some young females mate with their fathers. Furthermore, male sub-adults are dispersing very young (often at 18 months) as opposed to 36 months in the Serengeti. At such a young age, the sub-adults have little chance of defeating resident males, leading to the long tenure of adult males and the disappearance of sub-adults males.

### How will collars help?

- Dispersing sub-adult males are frequently nomadic for numerous years, wandering over vast distances and often come into contact with humans and livestock. As they are the main demographic associated with human -lion conflict, collars will help alert us to potential problems
  - Sub-adult males provide the primary means of connecting subpopulations thereby maintaining genetic diversity. Furthermore, successful dispersal within an ecosystem is critical for maintaining genetic diversity within a population. In an ever-evolving ecosystem, collars will help to identify priority landscapes for protection
  - Considering that two of the major threats facing lions are human-lion conflict and habitat fragmentation, it is therefore highly relevant to focus on dispersing male lions.
- 4. Without collars we will never understand what is happening to this vital demographic



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### FAQs

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How long will the collars be on for? The collars will automatically drop off in September 2017

1.

1.

3.

2.

3.

### How do collars work? Collars collect GPS locations at pre-prescribed times. Data is then sent to a satellite where it can be accessed online

## Where will the collars be deployed?

We aim to deploy the evenly collars throughout the ecosystem. Keep in mind that dispersing sub-adults may move long distances

### Who authorised this? MLP has been given a permit by the Kenya Wildlife Service to deploy these collars

## How do I find out more?

Please do not hesitate to contact us on the above address

# **Collars for Conservation**

## **Dispersing sub-adult male lions**

### The tourist experience

We fully appreciate that some tourists will have a 'knee-jerk' negative reaction to seeing a collared lion. However, previous experience shows that a collar can actually add to the tourist visit. People are drawn to the Mara because of it's emphasis on conservation, and a good explanation of the collar's purpose will highlight the conservation initiatives underway in the Mara. Furthermore, tourists are usually drawn to adult males, or females with cubs—sub-adult males are typically bottom of the must-photograph list. To minimise their impact, we will undertake the following:

- The collar belting is tawny coloured
- 2. We will make the data available for interest persons
- 3. We will distribute brochures to camps to provide more information
- 4. We will provide regular updates on collared individuals

### **Ethical considerations**

Our objective is to conserve lions and we therefore take their welfare seriously.

- All lions will be immobilised by a Kenya Wildlife Service veterinarian
- 2. Great care will be taken to ensure the safety of the animal
  - The MLP project director carried out a five year study on lion dispersal in Zimbabwe. He has participated in the capture and collaring of over 100 lions. The rest of the MLP team all has significant experience in radio telemetry.

### Outputs

The entire purpose of deploying collars is to aid management of lions and landscapes. As such we will aim to produce the following outputs:

- 1. A connectivity model that will identify priority landscapes for lions outside of protected areas
  - A landscape model to predict lion response to e.g. increased fencing, increased human/livestock populations, protection of 'corridors' etc
  - A detailed analysis of this vital life-history stage
- 4. A management strategy for lions inside and outside of protected areas

### Collar update

So far we have managed to deploy five collars. Once all the vital signs are stable, the collar can be fitted. The first step is to put the collar round the lion's neck to assess size. The ideal is for a collar to fit snuggly around the neck. Too loose and it will slide around, chafing the skin. At the same time it should not be too tight. The ideal fit is similar to how one might wear a watch.



The most important step of deploying a collar is checking the fit. Since this lion is likely to be wearing the collar for the next year, it is imperative that the collar is a good fit, keeping in mind the animal will be growing in the coming year. As such, all persons present assessed the fit of the collar. If consensus was reached we left it as is. If we felt it was too loose or tight, rearrangements were made.





Once the fit has been determined it is necessary to cut the collar to the perfect size. This is done to ensure there is no unnecessary belting still attached that will flap around on the lion. This process of assessing fit and cutting down is frequently carried out a few times until the perfect collar length is found. At left, the battery unit is on the ground and the black section is the automated drop-off.



Once the perfect fit has been attained and the collar cut an ideal length it is tightened with a spanner. At right, the yellow duct tape is holding a magnet in place which keeps the VHF part of the collar switched off. Once removed, the collar sends out a VHF signal audible on a receiver tuned in to the frequency the collar is emitting. Using an antenna you can locate the lion if you are within one and a half kilometers of the collar.

### Morphological and biological data

An immobilisation is the perfect time to record all sorts of interesting and useful data. Apart from taking blood samples for genetic and disease record analysis, we numerous measurements. This includes the teeth (right), the paws (below) and numerous other measurements of the body (bottom). It is also a good opportunity to do a thorough check of the animal's health status, and in some cases, injuries were treated.







All data for ENEfM1. DOB: May 2013

Originally from the Enesikiria pride (Naboisho). He is travelling with his two brothers and has spent a considerable amount of time in Olarro Conservancy and east of there.



All data for KWSaM2. DOB: January 2014 Originally from the KWS pride (MMNR), this male soon moved out of Naboisho and is frequently around the Keekorok Hills. He is travelling with his one brother.



### All data for PORaM1. DOB: Nov 2013

Originally from the Porini pride (OMC), this male has no brothers and is travelling alone. He has sopent most of his time up and down the Mara River, with a few trips "home" in the meantime.

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Originally from the Sampu-Enkare pride (Naboisho). He is travelling with his three younger brothers. He currently has a bad injury (possible leg dislocation) and is not moving a lot.

### Early inferences from collars

While the dataset is still in its infancy, some things are already emerging:

### Protected Areas

All collared lions are sub-adult males that are dispersing. In other words they are looking for a territory. In their search, they show little respect for protected area boundaries (unlike adult lions) and frequently cross into community areas, making them vulnerable to persecution.

### Rivers

Lions generally favour riverine habitats. The vegetation provides concealment for them and their cubs. The collared lions (see PORaM1 in particular) are consistently moving along river lines. The extra concealment provide by rivers is vital to them remaining undetected by much larger adult males.

### Elevation

The sub-adult males are showing strong selection for areas of high elevation. Notice how ENEhM1 moves along the ridge of the Pardamat hills, not dropping down west into the Pardamat plains which are heavily populated by humans. Indeed it is notable that the lions from Naboisho/Ol Kinyei have not ventured into the Pardamat plains, probably because they are too open and too densely populated. However, they regularly cross south, into Siana. KWSaM2 has spent considerable time in the hills east of Keekorok. Such areas provide good cover for lions.

Output: In early 2018 we will produce a connectivity analysis which will identify key corridors and critical habitats.



ENEhM<sub>2</sub>. This lion crossed the Aitong to Narok road, and kept heading north until he hit a barrier of croplands. This undoubtedly forced him to turn South. He then crossed straight through Lemek town and is currently south west of here.



ENEfM1 & SAMbM1. These two lions do not travel together, but consistently cross the Sekenani road along river drainage lines between Ngoalale and Kishermuruak. As the Sekenani road is due to be tarmacked, such crossing points must be protected.



# Education and Outreach



# "Because of the Predators"

Results from film discussions designed to identify community-led solutions to human-wildlife conflicts

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### The Results

### **Perceptions**

Participants were much more positive about predators after watching the film. This was particularly the case for women as only 58% were positive before watching the film, while 80% were positive about predators after watching it. The reason for this was that many women were unaware of the link between benefits and wildlife prior to watching the film. The film therefore provides a useful tool for making this link.



## % of people who had positive perceptions of predators before and after watching the film 60

Before After

## 100%

Every single participant stated that they were concerned about the state of the environment (particularly their grasslands) in their area and wanted to find solutions to human-predator conflicts.

### <u>Benefits</u>

Women (94%) reported to receiving more benefits associated with tourism compared to men (85%). Only 31% thought that predators were directly responsible for tourism, while most (68%) thought predators were partly responsible.

<u>Problems of living with predators</u>	People perceive lions to be the	
People are most concerned (79%) about predators killing	most difficult p	redator to live with
livestock, then the day to day disruptions associated with	Lions	87
predators $(74\%)$ , followed by concerns relating to death of	Cheetah	55
people $(27\%)$ Hyperparent the biggest problem in terms	Hyaena	76
c 1	Leopard	71
of livestock loss, but overall, according to our coexistence	Jackal	56
score, lions are the hardest predator to live with.	Wild dog	14



"If the conservancies and management authorities care about Maasais, then Maasais will also care about wildlife"

A discussion participant from Olkuroto

### Solutions to depredation

Participants ranked the reinforcing of bomas as the best means to limit livestock depredation, followed by increased awareness and improved herding. The community said that they were responsible for these top three solutions, but they needed some help. Lion lights were only identified by two groups as an efficient way of minimising depredation, while no one saw killing predators as a solution to stop depredation.

### Solutions to ease the burden of coexisting with predators

We then posed this to the participants: If predators remain in the Mara, there will always be some depredation - given this, what should happen to help ease the burden of living with predators? The top three answers almost always consisted of compensation, building of predator proof *bomas* and equal distribution of benefits. However, equal benefits was overwhelming the preferred solution, followed by compensation, while building of bomas never ranked first. Lion lights and predator relocation were never selected.



### Solutions to limit livestock depredation

Kill predators Fence protected areas Install lion lights Fence my land Improve grazing Early warning systems Reduce livestock numbers Improve herder vigilance **Community awareness Reinforce bomas** 



### Best means of easing the burdens of coexisting with predators



### Retaliation

Finally, we asked participants: "if your top three means to ease the burden of coexisting with predators were in place, do you think people in your area would still kill predators?" The majority of people (55%) stated that even if someone built them predator proof bomas, the local community would continue to kill predators. Therefore, building of *bomas* may not be a good solution to conserve predators.

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### **Management Recommendations**

When thinking of interventions, it is imperative to understand on whose behalf you are intervening the community, the wildlife, or both?

### Community intervention

The results of our film, show that in order to protect the livelihoods of the community, building of predator proof bomas is the best way to minimise depredation of livestock. Not only is this a popular community request, but they have identified it is being the most useful method.

### Conservation intervention

However, if you are primarily concerned with the conservation of predators, then building of bomas may not actually result in a reduction of retaliatory killings of predators. Indeed 55% of our participants stated that even if predator proof bomas were built for them, people would continue

to kill predators. In this case, limited resources would be far more effectively channelled towards ensuring a more equal distribution of benefits.

### Lion lights

Despite the proliferation of lion lights in the Mara, only two groups identified this solution as being useful to limiting depredation. This perception should be taken on board by any organisation thinking of installing lion lights within the Mara.

### Fencing

Fencing of private land was not selected once by community members as a solution to limiting the number of predator attacks. The proliferation of fencing in the Mara is therefore related to protecting grassland rather than livestock. This is therefore not a viable solution, since there is no community buy-in.

### **Best solution?**

Our results suggest that the best all round solution to ensuring human-predator coexistence is a more equal sharing of benefits. This includes monetary and non-monetary benefits (e.g. grazing) and will help predators and people. 41% of people still feel that there are more costs associated with predators than benefits. We therefore recommend that benefits are more equally shared and that there is transparency in all matters.



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### Wildlife Clubs

In January 2014, the Mara Lion Project, together with the Mara Cheetah Project set up Wildlife Clubs in five different schools around the Mara.

The five schools include:

- 1. ADCAM Academy
- 2. St. John Paul Academy
- 3. Irbaan Primary
- 4. Loigero Primary
- 5. Mara Hills Academy

In total 150 school children from class 4 to 8 have signed up to the Wildlife Clubs.

### **Game Drives**

We have taken wildlife club members on many field trips to the Maasai Mara National Reserve, Mara North Conservancy and Olare Motorogi Conservancy. The aim of these trips is to give the children a chance to experience and appreciate wildlife in their natural habitat as opposed to the stories of human wildlife conflicts that they are accustomed to. This opportunity gave the children a chance to experience what is on their doorstep so they can appreciate the ecological and economic role wildlife play which will hopefully foster the need to conserve them.

Our most notable trip to date was conducted in July in collaboration with Kicheche Bush Camp. We took thirty Wildlife Club members together with four teachers to Olororok Conservacy. They were privileged to be guided by James Nampaso, Johnson Kipira both from Kicheche and Dominic from MCP/MLP who joined the afternoon trip. They were lucky to see all the big five except rhino. Many thanks to Kicheche for their vehicles, guides, gifts, drinks and snacks. A truly memorable day! Officials from the Wildlife Clubs of Kenya (WCK) in Nairobi visited to train the patrons of the Wildlife Clubs and to formulate an action plan for each school. The action plans will help guide activities that increase the children's knowledge on conservation challenges and help solve them in their schools and communities. We have since developed a full curriculum of activities and Dominic Sakat visits each school once again to engage the children in activities. Now in their second year, a great many things have happened. The below pictures show some of the highlights:



### **Tree planting**

Tree planting exercises were undertaken in each of the five schools. In total 500 tree seedlings were purchased, organic manure transported from neighboring manyattas and trees planted around the school compounds. Dominic Sakat, the project's Community Liaison Officer, explained to the children the importance of trees, including halting of erosion and harvesting for crops or materials. With last year's rains the seedlings have been thriving.



The primary objective of the wildlife clubs is to inspire the next generation of wildlife conservationists.

### **Other activities**

Our curriculum is packed full of activities intended to motivate children to engage their minds in conservation issues, understand them better and make informed choices. Some activities are fun and lighthearted, while others are more serious, but necessary. For instance we organize debates, with topics such as 'which is a better use of land-crop production or wildlife conservation?' We have held art competitions and essay writing competitions-all with a conservation theme. Prizes are given and calendars will be created. Some activities, like football matches are designed to lift the spirits, while others, such as tree labelling are learning experiences of often overlooked parts of the ecosystem. We also engage in litter picking, in and around the schools and wider afield.

Most recently, we hosted a 'Kids Camp' where we invited 20 kids to stay with us for three days. They got to learn about careers in conservation from project staff and understand much better about what we are doing. There was also lots of fun to be had!



### **Boma Camera Trap Study**

Towards the end of 2015 we received 37 camera traps, cases, batteries and SD cards from one of our donors, WWF. Having completed the Nguruman Forest survey we then embarked upon a survey of bomas. Our aim is to assess predator presence and levels of attack at bomas in relation to variables such as distance to protected area, presence of dogs



Michael securing a camera trap to a wire boma



The community has received this initiative with much enthusiasm. We have had many people telling us that they did not realise that predators were visiting their bomas. Having seen the pictures, people are reinforcing their own bomas in order to prevent predators

and other deterrents etc. While some of this information can be gathered through more traditional human-wildlife conflict questionnaires, what can only be deciphered through camera traps, is presence of predators. We have now set up 16 cameras at bomas and plan to deploy the rest once the pilot study is complete.



A rare striped hyaena was captured at one boma



A leopard walks past Dominic's boma

entering them.

The cameras are also giving an insight into which predators are in which area, again giving us and boma owners valuable information as to how best to protect their boma from specific predators.

### Rapid Response to Wildlife Poisoning—a collaborative workshop

Poison is wreaking havoc on wildlife populations throughout Africa. It affects a wide variety of species, ranging from elephants, lions and eagles, to bees, fish and dung beetles. Poison is the major driver of vulture population declines throughout Africa and is a critical threat to terrestrial carnivores such as lions, as whole prides can be eliminated in a single poisoning event.

It is an ongoing threat with recent examples highlighting the severity and widespread nature of wildlife poisoning: 500 vultures dead in Namibia following a poached elephant carcass being laced with poison; over 100



Product name: Marshal. This pesticide is widely available and deadly to wildlife. Although legal if used on crops, it is illegal to use against wildlife.

elephants were killed in Zimbabwe after their salt licks and watering holes were poisoned; the famous Marsh Pride of lions eating a poisoned cow carcass in the Masai Mara; and thousands of waterbirds harvested at rice schemes in Kenya using poisons.

Apart from the shocking nature of these events, they highlight the multitude of reasons why people poison wildlife. The vultures were poisoned out of fear that their presence would alert rangers to the poached elephant, the elephants were killed for their ivory, the lions were poisoned because they had killed a cow,



The guest of honour, Chief Park Warden for the Maasai Mara National Reserve, Mr. Samson Lenjirr, officially opened the workshop.

and birds are poisoned to be sold for food.

There are also after effects: If a poisoned carcass is not properly disposed of, the poison can continue to kill. A hyaena eats a poisoned carcass and dies, a vulture feeds on the hyaena and dies, a fly settles on the vulture and dies. If the hyaena or vulture had offspring, they too are likely to perish due to starvation. An often overlooked fact is that these same poisons can, and do, kill people, either through direct contact or through eating poisoned meat.

Many poisonous substances are legal, inexpensive and widely available. Substances such as Marshal are in fact registered pesticides, but it is a criminal offence to use



A poison response kit—This is the equipment that all stakeholders who respond to such incidents should have at their disposal

them against wildlife (if convicted of killing a threatened species, the maximum penalty is KES20 million and/or life imprisonment). Pesticides and other poisons kill quickly and quietly and are therefore relatively easy to conceal from authorities. Combatting poisoning is therefore extremely difficult. Yet the effects of poison can be minimised through rapid and informed response.

By knowing how to identify a poisoning event, how to help affected animals, treat the scene like the crime-scene it is and properly sterilise the area, we can limit the death toll and secure convictions of wildlife poisoners.



Course participants involved in a practical session. A mock poisoning scene was laid out for crime scene investigation. Participants were required to search the scene and log evidence.

With this in mind, a group of concerned conservationists, comprising the Mara Lion Project, The Peregrine Fund, Nature Kenya and Birdlife International, organised the first ever Wildlife Poisoning Response Training in Kenya. Held at Ilkeliani Camp in the Maasai Mara on the 15<sup>th</sup> and 16<sup>th</sup> of November and led by Andre Botha, a wildlife poisoning expert from the Endangered Wildlife Trust, the training covered all aspects of wildlife



Participants felt better prepared after the training

poisoning and how to minimise its impacts.

While the majority of the 41 participants were based in the Maasai Mara, others travelled from Lewa, Borana, Samburu, Soysambu, Laikipia and Amboseli. The trainees left with the knowledge to limit the impacts of poisoning events and are committed to training colleagues within their organisations. This will help to ensure that the information is passed on and has a wide reach. Plans are underway to conduct more training sessions and spread knowledge to all areas of Kenya. This training event was supported by San Diego Zoo, the African Wildlife Foundation and Fondation Segré.

Recommendation: All management authorities should equip their rangers with a poison response kit. At least one ranger should be trained in rapid response to poison events. Those who have attended training, should pass on the knowledge to colleagues. Through rapid and informed response, we can help to limit the impacts of wildlife poisoning.



An illustration of how poison can continue killing wildlife if the scene is not completely sterilised. This also illustrates how a great variety of species can be killed in a single event.

## What do you do before leaving a poison scene?



Left graph: Participants came to realise the importance of sterilising the scene of a poisoning incident so as to ensure that it doesn't remain within the ecosystem and continue to kill. Burning of carcasses until nothing remains is the most recommended method.

Right graph: Participants were much more confident in being able to identify poisonous substances having completed the training. This is important as it is an offence to carry poisons in wildlife areas.

### Ability to identify poisonous substances



### **Holistic Assessment**

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The Holistic Assessors programme has two main objectives:

- 1. Determine the factors that cause humanwildlife conflict
- 2. Minimise human-wildlife conflict in the priority cheetah and lion areas

Our Holistic Assessment programme was initiated to better understand the challenges facing predators in priority landscapes within the Mara ecosystem and come up with recommendations as well as activities geared towards promoting coexistence. The unique aspect of this programme is that we examine the ecosystem in a broad context to better understand the drivers of change in the priority areas.

For this initial work, we recruited and trained five community members living in critical landscapes outside of the protected areas. We demarcated a "zone" for each person to patrol within, collecting data on human settlements, human-wildlife conflicts, herbivore communities and grassland health. These five personnel engage with the community on livestock husbandry in an effort to improve ecosystem health and reduce human-wildlife conflicts. The data collected thus far was presented to the community during feedback barazas. Both the data and the feedback barazas are detailed below.

### Human settlements

Since the majority of threats facing wildlife in this ecosystem are anthropogenic in nature, our first step was to map anthropogenic infrastructure. In time, this baseline information can be used to assess habitat loss and the potential for human-wildlife conflict.

Given that half of all bomas are made from cedar posts, in the new year we are looking at ways to reduce this. The trade in cedar posts is causing deforestation and their use is certainly on the rise, particularly with increased fencing of land parcels. It is apparent that this area has a high human footprint that will undoubtedly have an impact on the Loita migration which is critical to both lions and cheetahs.

### **Conflict bomas**

Every day, each holistic assessor visits two bomas to ask them about human-wildlife



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conflict incidents they may have experienced in the previous seven days. By always visiting the same bomas each week we are able to continuously map out conflict incidents across 50 bomas.

In total the bomas were visited 775 times, while the inhabitants reported a conflict case within their boma on 63 occassions. Lions were believed to be the predator responsible on three occasions. Sadly, shortly after one of these incidents, the lions responsible (a young male and a young female) were poisoned a short distance away. These three incidents resulted in the loss of 20 head of livestock. Four people reported that cheetahs had entered their bomas and killed sheep. It is most likely that they were confused with leopards since this would be most unusual behavior for lions. Leopards were responsible for 17 conflict cases while spotted hyaenas were



### Graphs above and below depict the counts of livestock and wild herbivores seen in the 5 different zones.



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responsible for 35 incidents.

### Herbivore counts

Twice a week the holistic assessors visit two different plots to record grass height and cover, in addition to the number of herbivores, both wild and domestic. All zones had a great deal more livestock than wild herbivores. This was particularly apparent in zone 2 and 3 where a large number of shoats we Wildebeest seen. particularly were scarce which is of concern for the Loita Future migration. work will focus more understanding on the current extent of this migration.

### Acknowledgements

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We are grateful for the support of both local and international partners, without whom we would not have been able to achieve what we have. We would like to thank the following partners for their continued support and we look forward to continuing these partnerships going into the future:

- Mara Cheetah Project
- Narok County Government
- Kenya Wildlife Services (KWS)
- Maasai Mara Wildlife Conservancies Association (MMWCA) Lemek Conservancy
- Mara Triangle (Mara Conservancy)
- Mara North Conservancy

- Olare-Motorogi Conservancy
- Naboisho Conservancy
- Ol Kinyei Conservancy
- Ol Chorro Conservancy
- Enonkishu Conservancy

## Collaborations

We are proud to collaborate and work with institutions and individuals across the world and look forwards to continued combine

- Dr. Arjun Gopalaswamy
- Smithsonian Institution
- Kenya Wildlife Services (KWS)
- The Peregrine Fund
- Endangered Wildlife Trust
- Nature Kenya
- **Birdlife International**

### Affiliations

Nic Elliot of the Mara Lion Project is a member of the Wildlife Conservation Research Unit (WildCRU), University of Oxford.

The **Kenya Wildlife Trust (KWT)** is the umbrella organisation for the Mara Lion Project. The Mara Lion Project was established by the Kenya Wildlife Trust (KWT) and officially launched in October 2013 amid concern that the lion population may be declining. KWT recognises the vital importance of large predators, and particularly big cats, to both tourism and the surrounding communities. Nowhere is this more apparent than in the Greater Maasai Mara Ecosystem where tourists come from around the world to view big cats in a viewing experience unparalleled in Africa.



Wildlife Conservation Research Unit







### **Funding and Logistics**

### Donations

We are grateful to the following donors for their generous support of our work in the field. It is particularly difficult to obtain unrestricted support, and we would therefore like to thank the following for helping us out at critical times.

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- Sarah Ward
- Asilia
- Kicheche Trust





Transforming lives through tourism

### Long-term Funding

We are extremely grateful to the following institutions and individuals for their long-term, and continuous support of the Mara Lion Project. Your support ensures that the project can not only continue, but also grow and develop in response to rising challenges across the Greater Mara.

African Wildlife Foundation (AWF) for funding the Holistic Assessor Programme and much of our community activities, in addition to vehicle running costs and local staff costs

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Finally we would like to thank the Dundas family for their contributions and pass our most sincere condolences on the passing of Nigel last year.





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