MARA PREDATOR CONSERVATION PROGRAMME

MARA PREDATOR CONSERVATION PROGRAMME
KENYA WILDLIFE TRUST

ANNUAL REPORT 2018

KWT
KENYA WILDLIFE TRUST

Lead author and editor: Niels Mogensen

Contributors: Michael Kaelo, Kosiom Keiwua, Kelvin Koinet and Dominic Sakat

Maps and graphics: Niels Mogensen, Brian Schuh

Photographs: Niels Mogensen, Michael Kaelo, Dominic Sakat, Kosiom Keiwua, Kelvin Koinet

Cover photo: Kelvin Koinet

Design & Layout: David Mbugua

Printed in March 2019 by the Mara Predator Conservation Programme Maasai Mara, Kenya

www.marapredatorconservation.org

EXECUTIVE SUMMARY

The year 2018 was greatly influenced by the merging of the Mara Lion Project and the Mara Cheetah Project into the Mara Predator Conservation Programme. The main reason for this merger was to be able to include more predator species under our research scope, although our key focus species remain lions and cheetahs. The changing of the word project to programme indicates that is a long term study. In addition, it makes more sense to have all predators under one umbrella in for fundraising purposes.

We initiated a wild dog study, which is very exciting, to document the potential comeback of wild dogs in the Mara. We completed both lion and cheetah surveys for 2018 successfully. There was much engagement with key stakeholders, including community members, government officials and the surrounding Mara conservancies.

Through our dedicated community outreach team we continued to work closely with the surrounding communities. Our community activities are aimed at ensuring sustainability of conservation efforts through engaging community so as to promote human-wildlife-coexistence. We consult with the community to identify areas of concern, specifically related to human wildlife conflict, mitigation using sustainable community driven solutions, and resource management and community awareness programmes. In 2018 we continued to implement our planned community activities such as wildlife poisoning response training, Wildlife Clubs activities and meetings and workshops.

CONTENTS

2018 KEY HIGLIGHTS

Merger of MLP and MCP to form MPCP

Carried out 2 intensive monitoring sessions

Started a wild dog baseline study

Creation of new brand and website for MPCP

126 people equiped with poison response skills

2 model predator proof bomas built

1 annual kids camp hosted at the Tony Lapham Predator Hub

RESEARCH UPDATE

Intensive Monitoring

During our intensive monitoring sessions (IMS), we continuously quantify our effort. Cyber Tracker, installed on our smartphones and tablets, takes a GPS point every 10 seconds, and so we can measure the distance of our tracks and the time spent driving and hence record our effort. We cover the entire study intensively with equal effort as much as possible. The MPCP team records all sightings of predators, prey, livestock, vehicles and people. Each session spans a period of 3 months, which ensures population closure. With both of the 2018 intensive monitoring periods successfully completed, we can now compare figures and maps.
IMS1 (without the wildebeest migration)=01Feb-02May, IMS2 (with the wildebeest migration)=01Aug-31Oct.

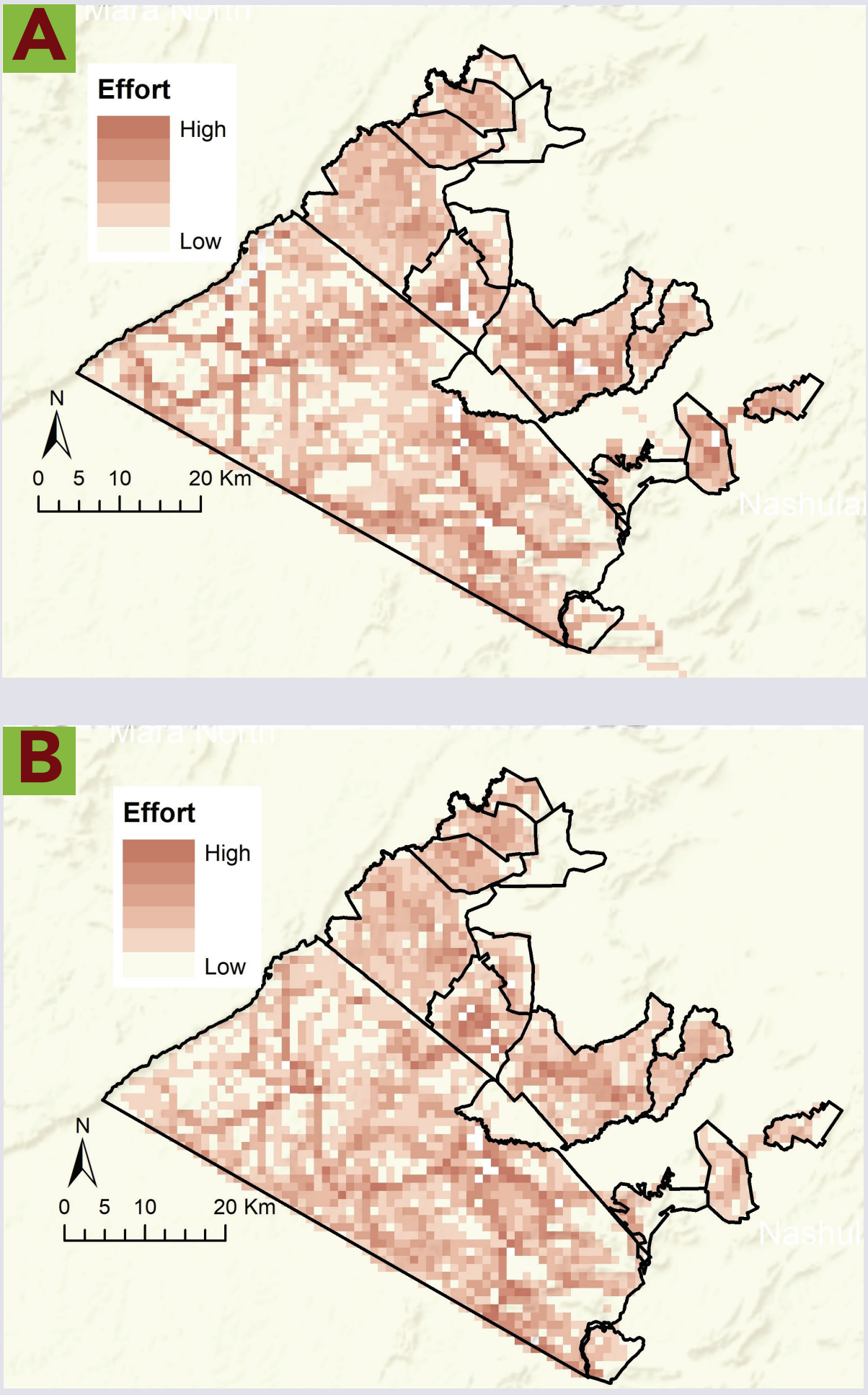

Fig.1. 2018 intensive monitoring effort maps. A: IMS1 10544 km driven, B: IMS2 9680 km driven

Lion and cheetah sightings

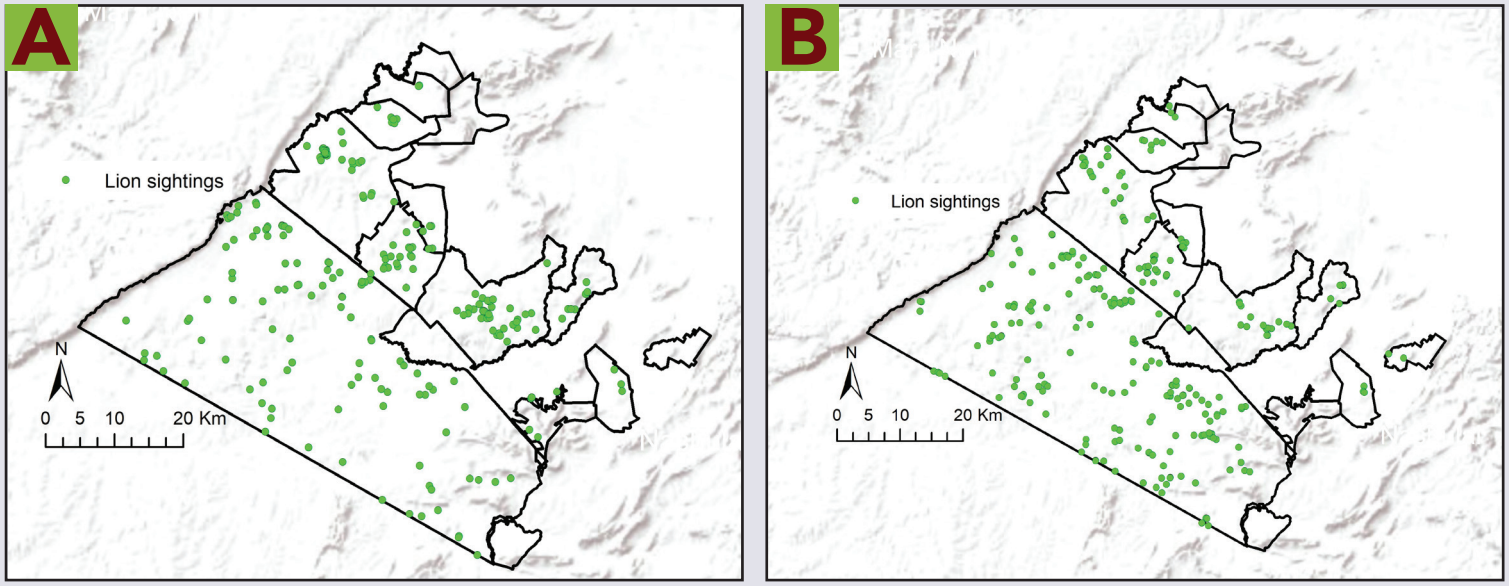

Figure 2: Lion sightings A: IMS1 223 sightings, B: IMS2 277 sightings

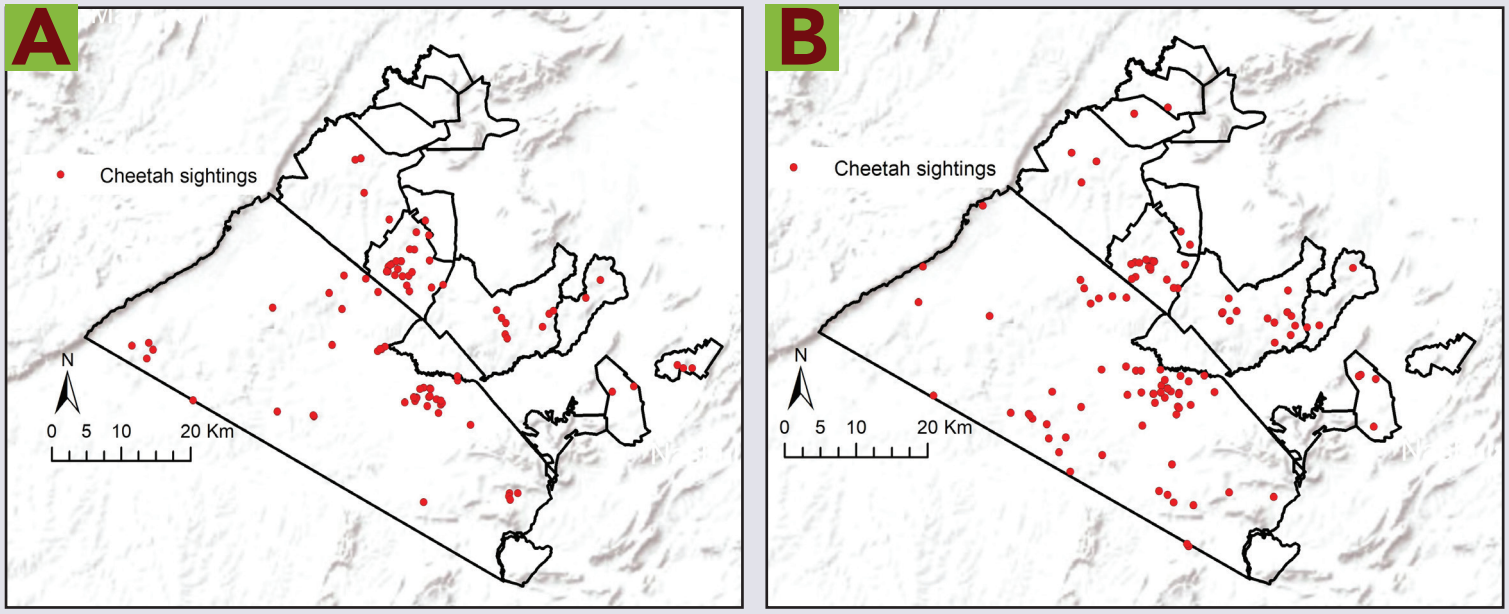

Figure 4: Cheetah sightings A: IMS1 86 sightings, B: IMS2 105 sightings

As can be seen from the figures, we had more effort (km driven) in IMS1 than in IMS2, yet we recorded more sightings of both lions and cheetahs in IMS2. A plausible explanation for this scenario is the 2018's weather pattern (see appendix, figure 23). The Mara received more than average rainfall during the first five months (980 mm), and so IMS1 was very wet. Water sources, and access to them, become plentiful and the prey scatter, and prey availability decreases. This can make it more difficult to see predators during the rains. As the grass cover increases, the detectability decreases. IMS2 is the opposite scenario and is also during the wildebeest migration, which attracts more predators and makes them easier to see.

Accounting for our effort and coupled with our sightings shown on the maps, enables us to calculate indexes of abundance. The maps produced are weighted according to the number of kilometers driven per area and the number of individuals seen.

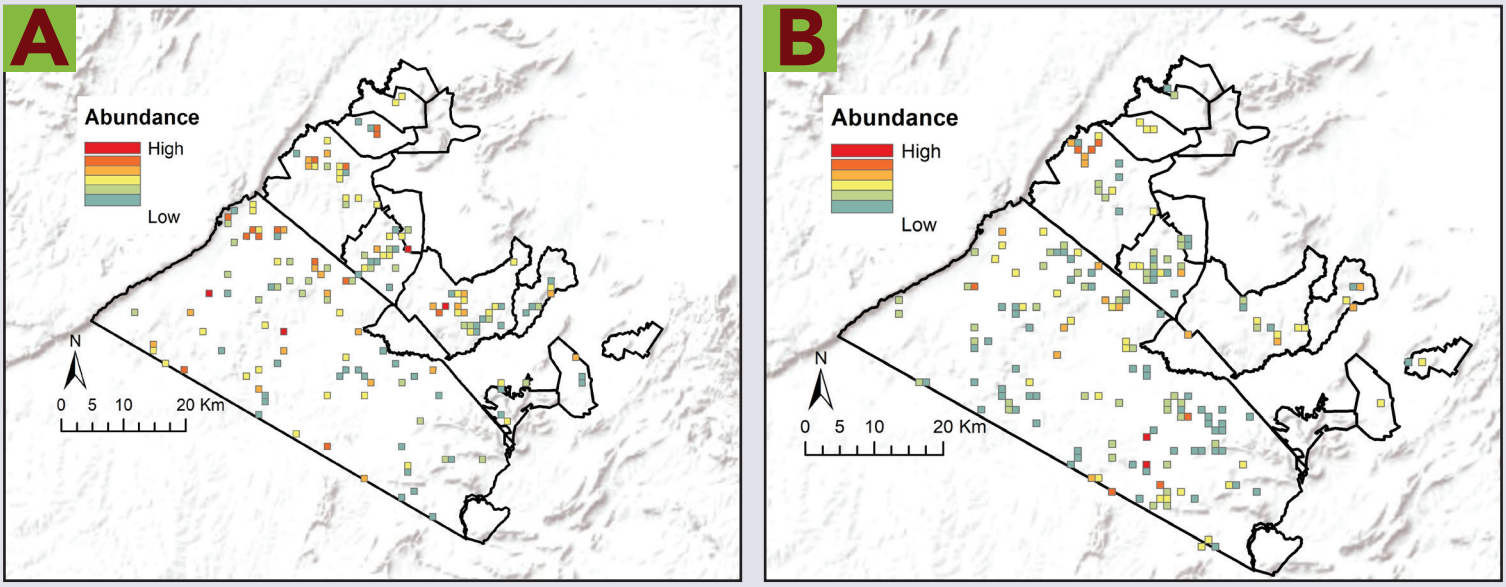

Figure 3: Index of abundance for lions. A: IMS1, B: IMS2

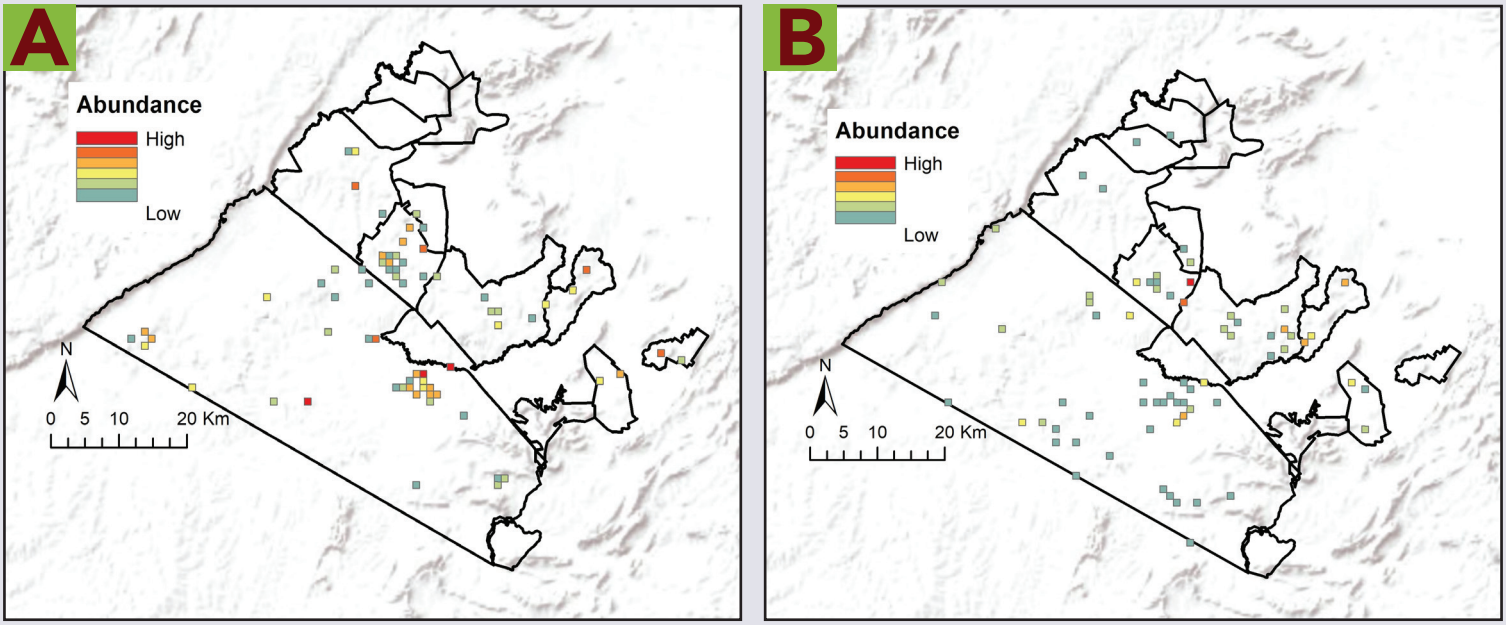

Figure 5: Index of abundance for cheetahs. A: IMS1, B: IMS2

The cheetah abundance map (figure 6) is particularly noteworthy. Cheetahs have a higher abundance in the Reserve during the migration (IMS2) than without the migration (IMS1), which probably means more cheetahs are attracted by the abundance of migratory animals in the Reserve. This is a trend that we have been seeing since we started the intensive monitoring sessions in 2014. We will fully analyse the data to see if our assumptions are correct.

To fully calculate the true densities and population trends of lion and cheetahs, spatially-explicit capture-recapture analysis has to be performed. This takes a long time to do but we will soon be coming out with proper updated density estimates. We are however able to gain some insight into potential population trends by calculating the number of predator sightings in relation to the distance driven during each IMS. This is shown in the following graphs for lions, cheetahs, spotted hyenas, and black-backed jackals.

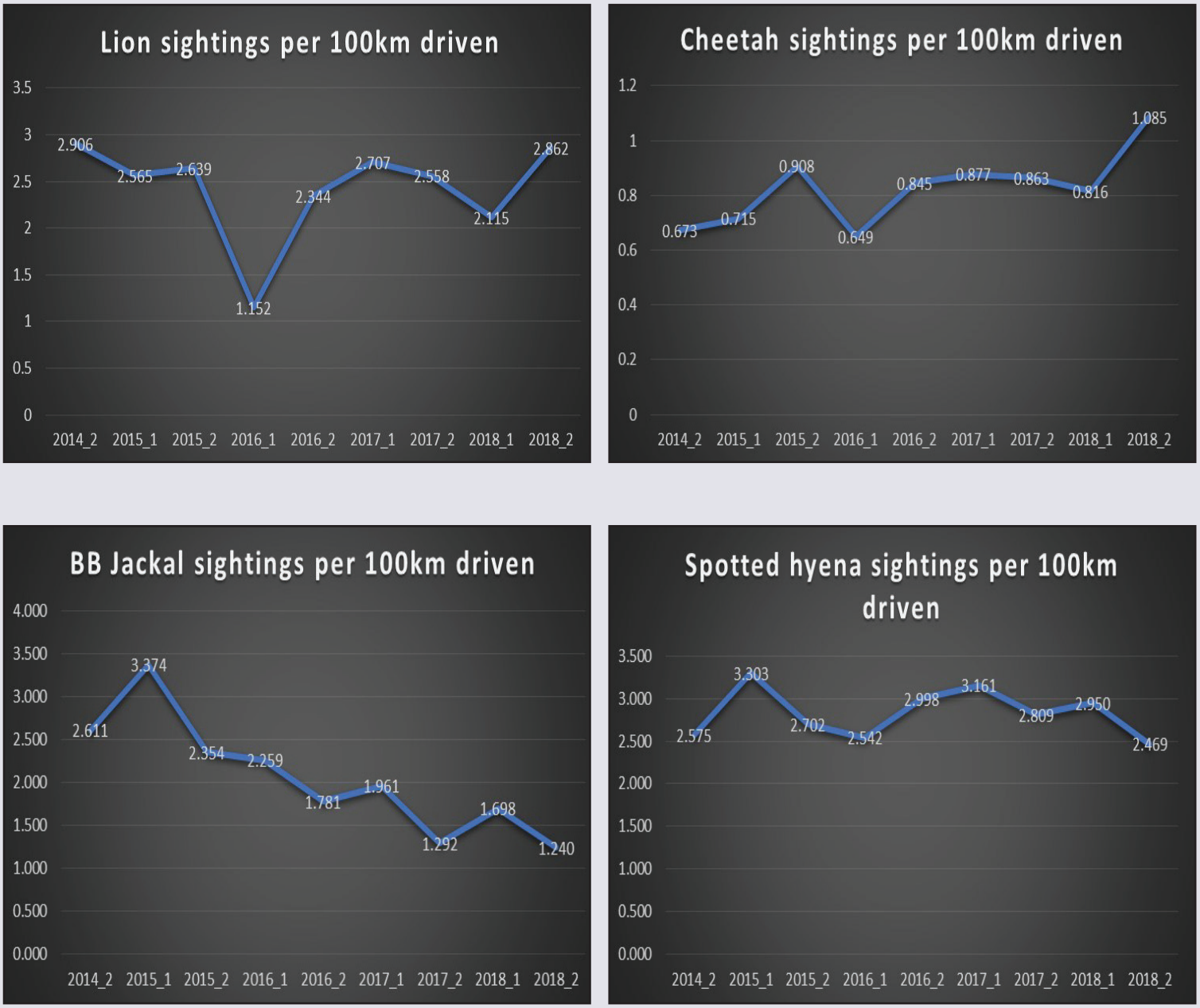

Figure 6: The four graphs show predator sightings per 100 km driven

Natural annual fluctuations are normal and expected, and from these graphs, only black-backed jackals are showing a downward trend. Reasons could be many but disease such as mange may play a role. Lions had a dip in the number of sightings per 100 km driven in 2016_1 (IMS1 of 2016). This period was characterized by very tall grass and so lions may have been harder to find. The only way to know if this was the reason behind the dip or if the lion population truly dropped, the data must be analysed using the spatially-explicit capture-recapture technique.

Livestock density

Livestock is an important variable, affecting the density and distribution of predators. We therefore continuously record all sightings of livestock during our intensive monitoring periods.

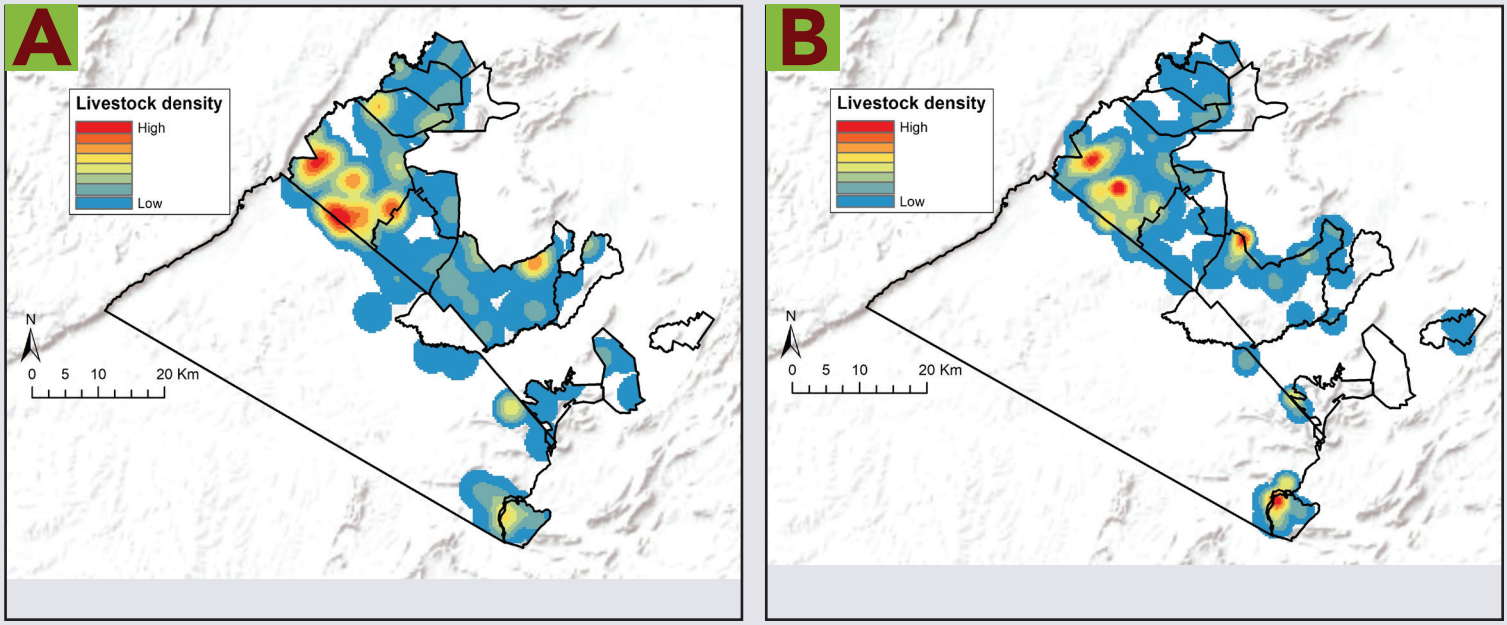

Figure 7: Livestock density maps A: IMS1, B: IMS2. The density is based on livestock sightings, correcting for distance driven

The higher density of livestock levels in IMS1 compared to IMS2 is probably due to less grass availability during IMS1 following a prolonged dry spell. The high level of rainfall during the first five months resulted in more grass availability during IMS2 outside the protected areas, resulting in lower grazing pressure inside the protected areas.

Figure 8: Lions observing livestock in a conservancy. Photo Niels Mogensen

Loss of Iconic male lions in 2018

Four Kilometre boys

Lipstick and Blackie, who were part of the well known Four Kilometre Boys coalition, were very popular in the Paradise Plains and the Double Cross areas. They were distinctive with Blackie having a small black spot growth on his nose and Lipstick with a lower lip that stuck out and was visibly red, hence their names.

A series of events dating back to 2016 lead to Lipstick's death and Blackie's disappearance in late 2018. In mid 2016, the Enkuyanai pride was pushed towards the Double Cross area by the Moniko males as Mohican, who was one of Engoyanai's pride males, was growing weaker from his hind leg injury after many fights with the Moniko males. Mohican and his partner, Romeo 2, came close to the Four Kilometre Boys' territory and this caused numerous conflicts between the two coalitions. In December 2016, Mohican succumbed to his injuries leaving only his partner Romeo 2 to defend Engoyanai pride against Lipstick and Blackie. Later, Romeo 2 ran away and left the pride. The Four Kilometre Boys were not powerful enough to keep the Engoyanai females from the stronger Moniko males, who defeated them and took over the pride. Lipstick sustained a series of injuries from the Moniko males and was growing older and weaker. In May 2018, during the long heavy rains, the grass had grown tall and the prey was scarce which meant less food for the Paradise lions. At one point, Lipstick tried to dig up a warthog from his hole but the warthog managed to stab him and he died by the entrance of the hole. Later in the year, the Six Pack coalition from the Moniko pride had established themselves in the Marsh and Paradise Plains areas and so Blackie was forced to leave. He was later sighted in Mara North Conservancy but then vanished and has not been sighted since.

Figure 9: Blackie left and Lipstick right. Photo Kelvin Koinet

Karibu

One of our first sightings of Karibu was near Musiara Gate. He was mating with Kini, one of the Marsh pride's young females at the time. In the following months, we followed Karibu and his brother Rafiki spending time in the Mara Triangle and in the Marsh area controlling the Marsh pride. In early 2018, after the Six Pack coalition from Olare Motorogi Conservancy had pushed themselves into the Marsh area, Karibu and Rafiki were forced to move to Mara North Conservancy together with a section of the Marsh pride that had cubs. The two males expanded their territory by taking over the different Cheli pride groups in the conservancy and started to rear many cubs. In October, two males, originally from the Angama pride in Mara Triangle, appeared in Mara North Conservancy, wanting a to take the Cheli females from Karibu and Rafiki. Karibu was attacked and severely injured by the Angama males, resulting in his death.

Figure 10: Karibu a few weeks before his death. Photo Niels Mogensen

Cheetah sightings and events

In 2018 we saw 60 different adult cheetahs (34 male and 26 female) over 237 sightings. The number of sightings of unique individual cheetahs ranged from 1 - 35. Table 2 is a summary of the number of different adult cheetahs that were seen in the different parts of the study area over the past year. It is important to note that the cheetahs range freely across the Maasai Mara and therefore some individuals would have been seen in two or more different areas. For this reason, the sum of the totals in Table 2 will not be the same as the number of individuals that are reported to be seen (60).

Table 1: Number of cheetahs seen in the different management areas in the Maasai Mara. The numbers in parenthesis are the number of cubs.

Management area	Area (km2)	Adult females	Adult males	Total
Maasai Mara National Reserve	1,025	14 (13)	22	36
Mara North Conservancy	345	2 (3)	4	6
Mara Triangle	500	3 (4)	5	8
Naboisho Conservancy	210	4 (9)	9	13
Ol Chorro Conservancy	53	1 (0)	0	1
Ol Kinyei Conservancy	75	2 (5)	0	2
Olare-Motorogi Conservancy	138	8 (9)	10	18
Olarro North and South Conservancies	83	5(8)	2	7

Cub births and survival

In 2018 we recorded the births of 20 cubs to six different females. Of these, 13 have survived to date and are more likely to make it to independence now because of their larger size. There were some reports of births that we did not confirm. Most of the females that were reported to have given birth were later sighted by MPCP being without cubs and so these cubs would have been lost quite quickly, had they given birth. Cheetah cubs die due to an array of reasons including disease, starvation, abandonment and predation by other carnivores. Unfortunately in most cases, it is extremely difficult to establish the cause of death.

New adults

In 2018 we sighted nine new individuals. Four of these were dispersers and all were adult males. Cubs tend to leave their mother when they are around 18 months old but this can range between 14-22 months. In 2018, we recorded three dispersal events of five male cubs from three resident females. This is lower than in 2017 where eleven cubs dispersed from five females. However, with the large number of cubs that were born in 2018, we suspect that there will be a high rate of dispersal in 2019.

In addition to the dispersal of cubs from known cheetahs in the Mara we also came across two separate young males who were likely dispersals from other areas. The two single males were first sighted in early 2018 in the Maasai Mara National Reserve where they continue to be sighted.

Figure 11: Olchore when first sighted in Maasai Mara Game Reserve. Photo Kosiom Keiwua

Adult deaths

Of the 56 adult cheetahs that were sighted in 2017, 47 were re-sighted in 2018. Of the nine that were not re-sighted, two were confirmed dead. It is possible that some of the seven individuals that were not sighted in 2018 might reappear at some point, while others could have died.

The last sighting of the Keekorok male alive. Photo Kosiom Keiwua

In 2018 we recorded the deaths of two adults, one female, known as Naretoi and one male called the Keekerok Male. The male was suspected to have died from injuries sustained by a lion, while the female died from a result of disease/condition that the Mara Vet unit thought to be a hypoglycemia encephalopathy.

We suspect that there might have been a few more individuals that have died during this period, but we have been unable to document this.

The last sighting of Naretoi alive. Photo Kosiom Keiwua

Mara wild dog study

In mid-2018, MPCP initiated a wild dog baseline study to investigate the status of resident wild dogs in the Mara and to gain insight into dispersing dogs from the Serengeti. Of particular interest is a pack of wild dogs roaming the hills around Enoonkishu, Lemek and Pardamat/Aitong, and this is where we are focusing our current efforts. We deployed camera traps around potential den sites in this area but none of the sites have been wild dog active so far. With continued camera trapping together with information from guides and rangers, we hope to identify the number of dogs who use this area and establish their demographics and movements.

There is also a potential wild dog pack roaming in the areas around Siana. The MPCP team recorded a group of four wild dogs; three female (one collared) and one male were in the western side of Siana Conservancy, close to the reserve boundary. One of the females was observed to be lactating (Figure 12) and it was suspected that the pack was denning either in the Siana hills or Angama hills inside the Reserve. Due to the rough terrain, the team were unable to locate the den and none of the conservancy or reserve rangers or guides had knowledge of the exact den location. A few months later, the same group were sighted by MPCP in Naboisho and Olare-Motorogi Conservancies, without any offspring, and it is assumed that any puppies the pack had, were dead.

Figure 12: Lactating female in Siana Conservancy. Photo Kelvin Koinet

An active den and wild dog pack was identified by the border of Tanzania, close to a place called Olpusimoru, around 43 km east of Olderkesi Conservancy. Ten puppies were captured by our camera traps and nine adults were sighted by MPCP personal.

On consultation with the Serengeti Wild Dog Project, it was determined that this wild dog pack, named Soit Sampu pack, had earlier been released after translocation by TAWIRI to a nearby area with the same name. Due to the habitat in the area, the MPCP team lost track of the dogs once the pack left the den.

Figure 13: Camera trap photo of wild dogs belonging to the Soit sampu pack

In order to engage with the local communities to create awareness about wild dogs, address human-wild dog conflict and to discuss emerging issues related to wild dogs, we held a wild dog baraza (community gathering) with Olderkesi Conservancy. The baraza was attended by 17 participants and was a key step towards close collaboration with community members in conservation of wild dogs in the area. We will be having similar barazas in the Paradamat, Aiton, Lemek and Enoonkishu areas and also in Siana and Olarro.

One of our objectives is to establish collaboration with the Serengeti Wild Dog Project, as we are seeing groups of wild dogs dispersing from the Tanzanian side (we know this because of GPS collars on dog individuals). We therefore arranged a visit to Loliondo where we held a workshop with representatives from Tanzania Wildlife Research Institute (TAWIRI), Serengeti National Park (SNP), Loliondo Game Controlled Area (LCA) a representative of range wide conservation program for cheetah and wild dog, KOPE lion project among others. MPCP were particular interested in learning about their research techniques and their knowledge of wild dog movements into the Mara. Another aim of the workshop was for both sides to foster cross-border collaboration in studying wild dogs and other predators. One key recommendation from the workshop was to establish linkages for policy and collaboration through forums between the relevant authorities in the two countries to ensure smooth collaboration in research.

A social survey was conducted to understand human-wild dog conflict, local people's perceptions and attitudes towards wild dogs in human dominated landscapes. Four data enumerators were identified and trained on how to collect data for the social survey work covering four villages and 60 households

Figure 14: Attendees of the Loliondo wild dog workshop

within the Lemek region (see figure 15). The results from this survey will be analysed in the upcoming months of 2019.

This will greatly influence decisions on wild dog conservation at the local scale and when we are able to establish active dens, they will act as a pointer to where conservation efforts should be prioritised.

We will be having similar surveys in Siana and Olderkesi.

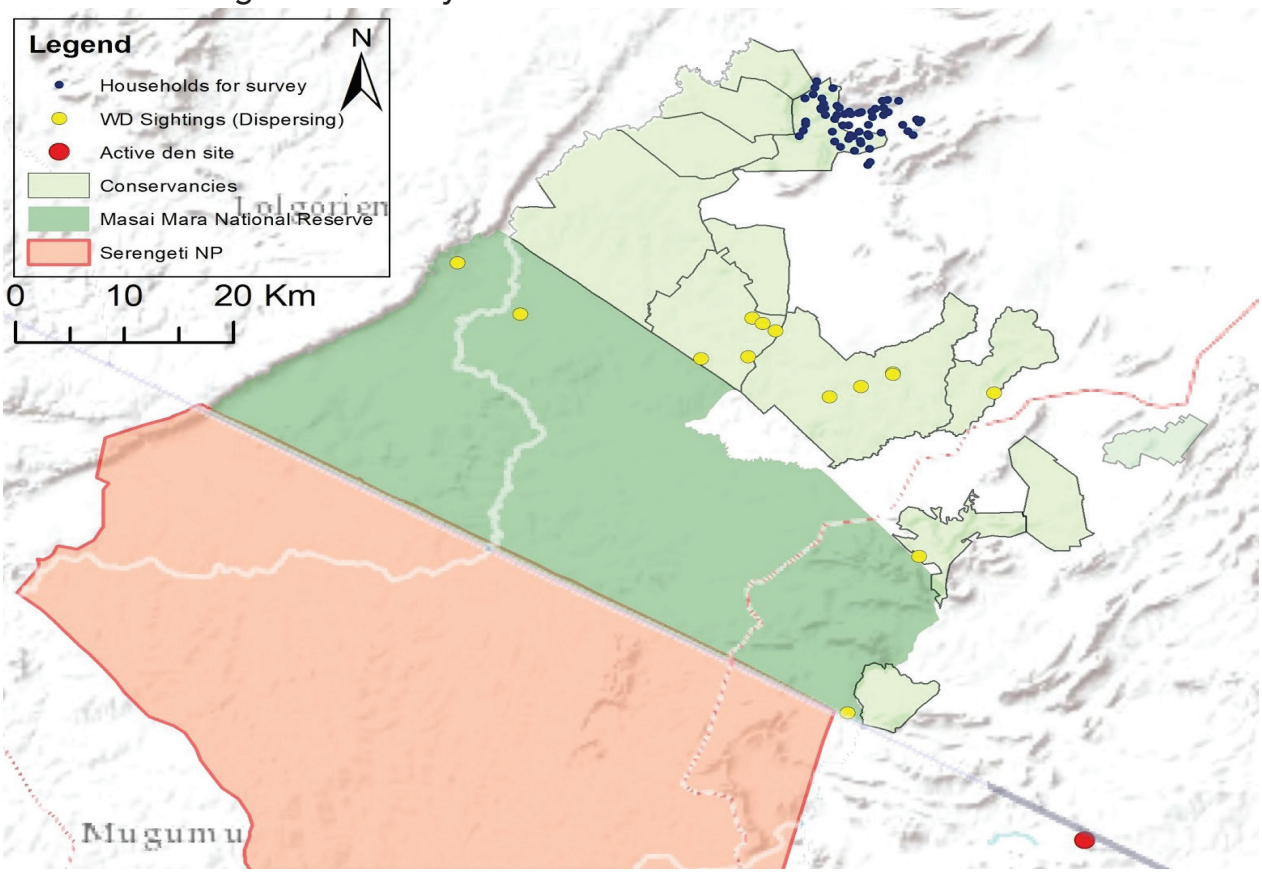

Figure 15: Locations of dispersing wild dog sightings, the active den by Olposmoru and the households chosen for the survey.

COMMUNITY UPDATE

© Reuters

Alongside our research efforts in 2018, we continued our community engagement programme. Through our dedicated community outreach team we work closely with our surrounding community. Our community activities are aimed at ensuring sustainability of conservation efforts through engaging community so as to promote human-wildlife-coexistence. We consult with the community to identify areas of concern, specifically related to; human wildlife conflict; mitigation using sustainable community-driven solutions; and resource management and community awareness programmes. We implemented our annual community activities which included Wildlife poisoning response training, Wildlife Clubs activities and meetings and workshops. A summary of each of these is discussed below in detail:

Wildlife Poisoning Response Training

Wildlife poisoning does not discriminate and if not well addressed, it may have adverse effects on humans, domestic animals and wildlife. Thus, timely response to poisoning incidents can significantly reduce resultant wildlife deaths and environmental contamination.

It is based on this understanding that the Mara Predator Conservation Programme in partnership with Nature Kenya organized poison response training, targeting conservancies, county rangers and community representatives within the Greater Mara Ecosystem. The training was based on the national wildlife poisoning response protocol which was collaboratively developed by Kenya Wildlife Service in partnership with the non-governmental conservation institutions.

The broader aim of this training was to equip the participants with the requisite skills to enable them to attend to and manage wildlife poisoning incidents. Through building a network base of persons with on-ground skills to support wildlife veterinarians and county wardens, we aim to enhance responsiveness to wildlife poisoning incidents.

In total, 45 conservancies rangers from 15 conservancies, 16 Narok County Government rangers, 20 community ToTs and 45 community representatives were trained in 2018.

Upon completion of the training, each conservancy was supplied with a 'Poison response kit' containing the equipment needed to safely respond to poisoning incidents. In addition, a document on the key steps to follow in responding to wildlife poisoning was shared to the participants to enhance their effectiveness while responding to poisoning incidents.

Figure 16: Wildlife Poisoning Response Training

Antipoison campaign

In an effort to create awareness and sensitize the public on the dangers and effects of wildlife poisoning, MPCP in collaboration with Nature Kenya, held anti-poisoning campaigns. Increasing awareness is one of our key strategies in reversing the trend by communities taking appropriate actions during incidences of livestock predation. The seven-day awareness campaigns was conducted in seven strategic market centres. The activity entailed holding two public meetings in each of seven market centres, one in the livestock section that comprised mainly of men and the second in the foodstuffs section, that comprised mainly of women.

The choice of markets centres was based on Mara landscape representation, wildlife poisoning hotspots and central meeting points for most people, hence a wider audience. The turnout was commendable and varied from market to market and ranged from 800 – 1000 per market.

The message was underscored by Buffalo Dancers who are a group of 'Morans' who advocate for conservation initiatives through folk songs and skits. The dances and skits were interactive and the public was indulged. Some of the community volunteers championing conservation initiatives were rewarded with T-shirts while 'stop wildlife poisoning' flyers were distributed to the general public.

Community Barazas

Figure 18: Community baraza

We held five community barazas this year, with the aim of discussing various aspects relating to co-existence between people and wildlife. The barazas held in September at Endoinyo Erinka, Laila, Enkeju enkoirien, Saparingo and Laila were attended by more than three hundred people (both men and women). They provided a forum by which our community film "Tenkaraki ilowuarak" was screened and discussions held on ways to improve chances for a bright future for people and wildlife.

Lessons learned from the discussions

Area	Benefits recieved	Challenges
Enkeju enkoirien	- Scholarships and bursaries for children - Grazing rights in conservancies	- Hyenas killing shoats - Lions killing cows
Laila	-	- Elphants rainding farms - Leopards killing shoats at night in bomas

The recommendations from the above is that, there is a need to adopt a holistic approach while formulating laws and policies that govern conservation efforts. Deliberate efforts should be made to ensure that areas bordering Protected Areas receive benefits from wildlife, be it monetary or development projects. There is also a need to address different Human-Wildlife Conflicts using appropriate mitigation strategies to encourage co-existence. Finally, capacity building of communities on various strategies for coexistence and avoiding conflict are a prerequisite for positive interactions and positive attitudes.

Predator proofing bomas using recycled plastic poles

Large predators often roam in the matrix outside protected areas, consequently bringing them into contact with communities that rely on livestock for their livelihoods. As a result, there is bound to be conflicts, thus the need to employ effective tools and management practices that mitigate the negative effects of predators.

As a mitigative measure, MPCP constructed pilot predator proof livestock enclosures using recycled plastic poles. This smarter solution has so far been effective in ensuring the harmonious coexistence of lions and other large predators within community areas.
Two pilot bomas were constructed in 2018. The two homesteads were selected based on the fact that they were reporting high incidences of conflicts.

Figure 19: Predator proof boma with recycled plastic poles

We believe that the recycled plastic poles

are the way forward for for constructing predator proof bomas. These poles are not susceptible to damage by termites, they can be moved in case a person wants to relocate, and they provide a substitute to cedar posts which has resulted in forest degradation in the Mau and Loita Forests.

Besides constructing these predator proof bomas, we have also reinforced 9 existing poorly built bomas as a quick response approach to the increased conflicts reported, to minimize conflicts within the identified hotspot areas. This novel technique has greatly enhanced positive relationships between MPCP and the beneficiaries resulting in the reduction of predator attacks and loss of livestock. We anticipate that this initiative also improves the beneficiaries' attitudes towards predators.

Engaging school children in conservation

Engaging children in conservation is one of our our key objectives as a program. Even though these young learners live next to wildlife areas, many have never seen some of the cats like cheetahs and lions, and maybe only encounter them back at their villages as problematic animals. To change this perception and in trying to make them future conservationist, we have continued to engage them in various activities through Wildlife Clubs, working together with Wildlife Clubs of Kenya, which is the umbrella body of all wildlife clubs in Kenya.

Twende Porini

Twende Porini is Asilia's children's education project aimed at fostering an understanding of the need for conservation.

Our wildlife club members between the ages of 12-15 years from five schools participated in the Twende Porini competition. Children were asked to describe how they view conservancies around the Maasai Mara and how they impact their lives through artwork, essays and poetry. A panel of judges (from MPCP, The Maa Trust, and Asilia Naboisho Camp), met at the Tony Lapham Predator Hub and selected three winners from each school. The winners were then selected to stay in Naboisho Camp and were given the privilege to go out on game drives and were also given conservation talks from various organizations.

Figure 20: Twende porini

Annual game drives

We took more than 250 children to see wildlife in various wildlife areas. Our annual trips to community conservancies and the Reserve are the most popular activity for the children. We also educate them on conservancy grazing plans, Predator Proof Bomas and also visit local air strips to help them appreciate how people fly from other continents to come and see wildlife, especially predators.

Changing perceptions

We have seen the importance of these game drives since we started. Kids were asked to write a composition/story about their visit to wildlife areas and the results are amazing. Some never thought lions sleep most of their time and hunt wild animals and not domestic animals as mistaken. Some admire to be game wardens as well as guides. All these are signs of change of perception of wildlife.

Figure 21: Game drive with school children

Holiday Kids Camp

Twenty children from our wildlife clubs schools attended our holidays kids camp. They were engaged in various activities including nature walks, hands on learning of our work at the Predator Hub, and a game drive in the Maasai Mara National Reserve. The aim of the holiday kids camp is to offer children an opportunity to interact with our methods of work, cultivate a passion for conservation and encourage them to "learn by doing" as a tool to inspire them.

Figure 22: Holiday kids camp

Wildlife clubs Art competition

We held an art competition for all our Wildlife club schools in Aitong and Talek. The theme of the Art competition was dubbed "Savannah Sunset" with one hundred children taking part in the competition which yielded amazing art work. Our art competitions are geared towards encouraging the young minds to develop a passion for conservation while nurturing talents. We encourage them to express their view of nature through art and this way we can influence attitudes through positive programmes designed to reinforce positive attitudes to nature e.g nature walks and game drives in protected areas. Some other activities the clubs have been able to undertake include composing environmental songs and poems, school clean ups and a patrons meeting to discuss plans for the New Year.

APPENDIX

Weather

The weather was unusual with with an above average precipitation, totaling 1,304.50 mm of rain. Most of this rain fell in the year's first five months (980 mm).

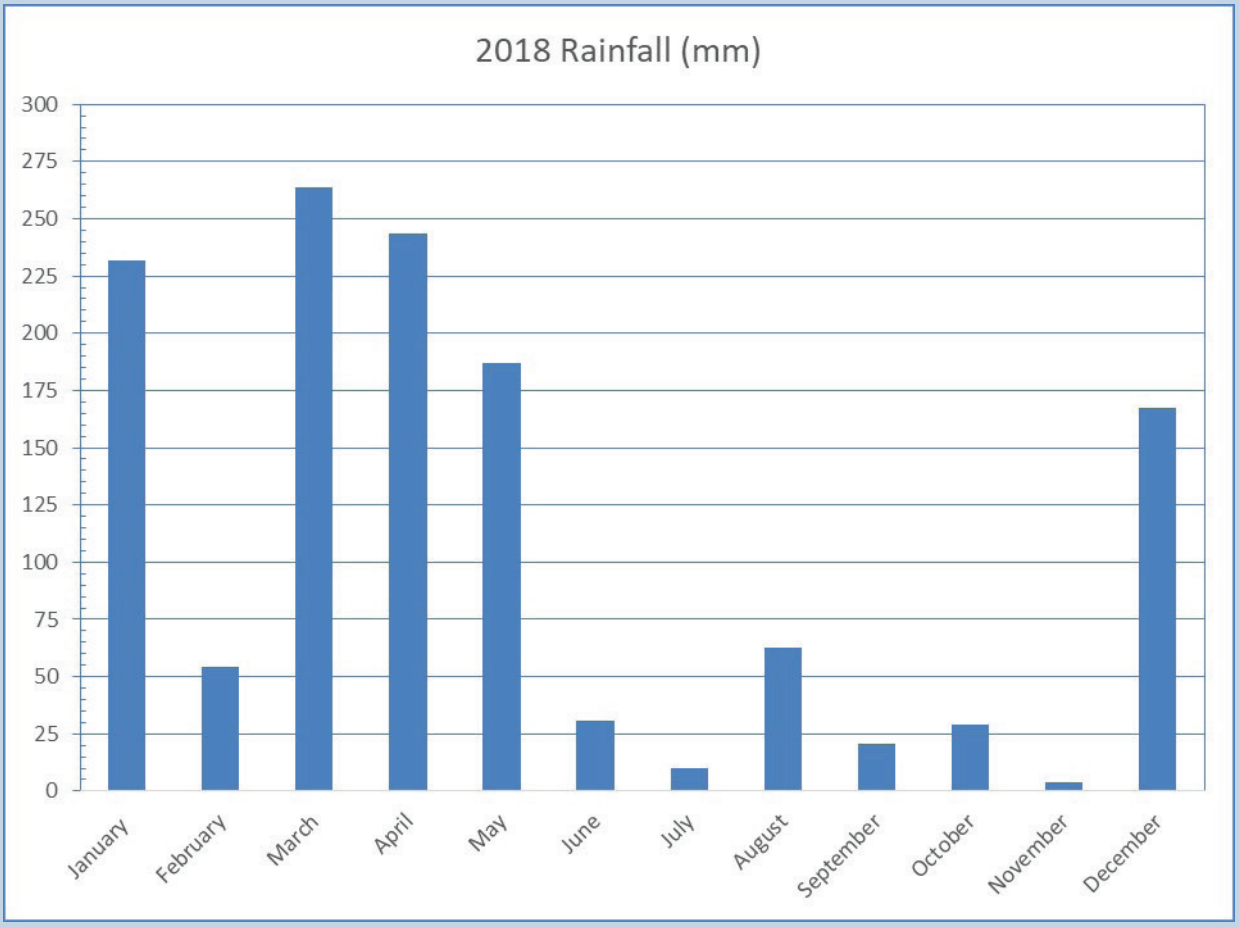

Figure 23: 2018 monthly rainfall

Staff publications

Madsen, E.K. & **Broekhuis**, **F.** (2018) Determining multi-species site use outside the protected areas of the Maasai Mara, Kenya, using false positive site-occupancy modeling. Oryx.

Broekhuis, F. (2018) Natural and anthropogenic drivers of cub recruitment in a large carnivore. Ecology and Evolution.

Broekhuis, F., Thuo, D. & Hayward, M.W. (2018) Feeding ecology of cheetahs in the Maasai Mara, Kenya and the potential for intra- and interspecific competition. Journal of Zoology, 304, 65-72.

Klaassen, B. & **Broekhuis, F***. (2018) Living on the edge: multi-scale habitat selection by cheetahs in a human-wildlife landscape. Ecology and Evolution. *Joint first authorship

Løvschal, Mette & Håkonsson, Dorthe & **Amoke, Irene** (2018). Are goats the new elephants in the room? Changing land-use strategies in Greater Mara, Kenya. Land Use Policy.

Aknowledgements

Our 2018 achievements were only possible through collaborations and support from our dedicated partners. We would like to extend our sincere gratitude to everyone who supported us in 2018.

In particular, we are extremely grateful to the following organizations for their support in 2018:

Mara Predator Conservation Programme
info@marapredatorconservation.org | www.marapredatorconservation.org

@MaraPredator @marapredatorconservation MaraPredatorConservation