MARA PREDATOR CONSERVATION PROGRAMME

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KENYA WILDLIFE TRUST

ANNUAL REPORT | 2020

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KENYA WILDLIFE TRUST

EXECUTIVE SUMMARY

THIS ANNUAL REPORT covers the progress of the Mara Predator Conservation Programme (MPCP) in 2020. The overall goal of MPCP is to support stable, healthy predator populations in the Greater Mara Ecosystem by providing scientific evidence for conservation action. The programme is strongly guided by Kenya Wildlife Trust's value proposition of being driven by science and focused on people.

The COVID-19 pandemic heavily affected the Mara Predator Conservation Programme financially in the year 2020, limiting our overall activities. Despite the restrictions and limitations, we managed to complete the year's three months' intensive monitoring session for our research team. We recorded 258 lion and 78 cheetah sightings during the monitoring session. The updated lion & cheetah densities will be published in the 1st quarterly report of 2021.

The research team deployed seven lion collars on adult females and sub-adult males to gain insights into their spatial ecology.

All cheetah demographic parameters were recorded and kept up to date, including 20 cheetahs individuals who survived their first year.

Although the wild dogs that MPCP monitors continue to cause conflicts by deprating on livestock, the four adults and eight juveniles of the Pardamat-Lemek pack are still alive. Furthermore, a new group of four females were recorded and they teamed up with four members from the Pardamat-Lemek pack. The Mara Predator Conservation Programme's community outreach team implemented various activities aimed at increasing tolerance to predators by communities.

In our efforts to increase lion conservation footprint across the Mara and support communities in mitigating human-wildlife conflicts, we recruited a team of ten lion ambassadors to work in regions bordering protect areas.(Maasai Mara National Reserve and Conservancies)

The outbreak of COVID-19 limited community meetings shifting our attention to conflict mitigation through the construction of recycled plastic pole bomas and boma reinforcement. We also supported communities in responding to COVID-19 through a COVID-kindness initiative where hand-washing kits and awareness materials were donated. MPCP's Wildlife Clubs members were engaged through building of tippy taps to increase hygiene in their villages. We also supplied them with reading materials comprising of conservation themed books and also our Wildlife Club Book.

CONTENTS

ANNUAL LION AND CHEETAH INTENSIVE MONITORING SURVEY

In 2020, we completed our three months annual intensive monitoring survey (IMS). MPCP has been conducting these surveys since 2014, enabling us to obtain updates on lion and cheetah densities and distribution in the short term, while long term data will give us insight into population trends.

During the three months IMS, which continues to run from August 01- October 31, our effort totaled 9,287 Km of driving through the Mara conservancies and the National Reserve. This effort and our coverage of the study area is displayed in figure 1.
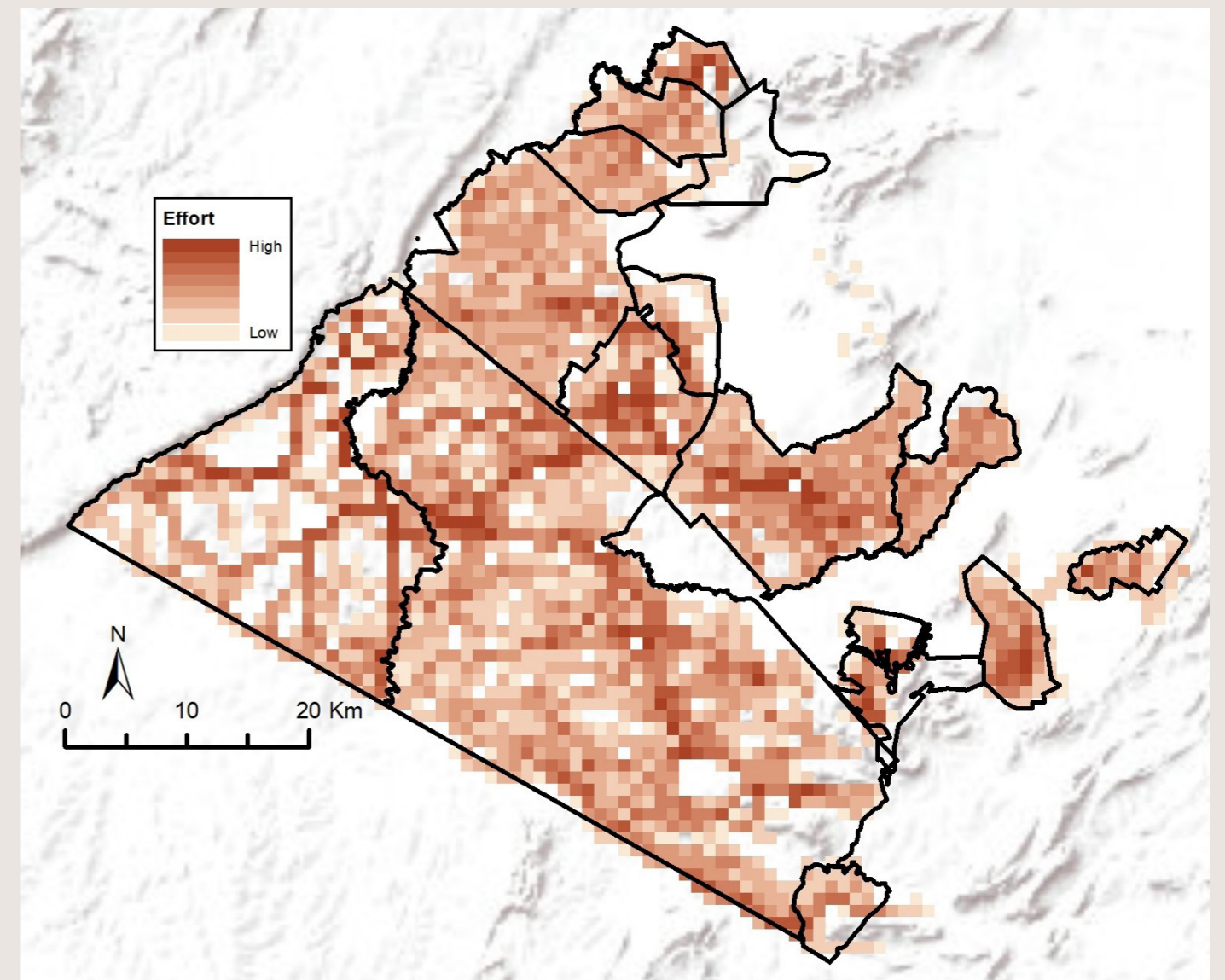

Figure 1. 2020 intensive monitoring effort map.

LION AND CHEETAH SIGHTINGS

We had a total of 258 lion sightings and 78 cheetah sightings over the three month period, and their distribution can be seen in figures 2.
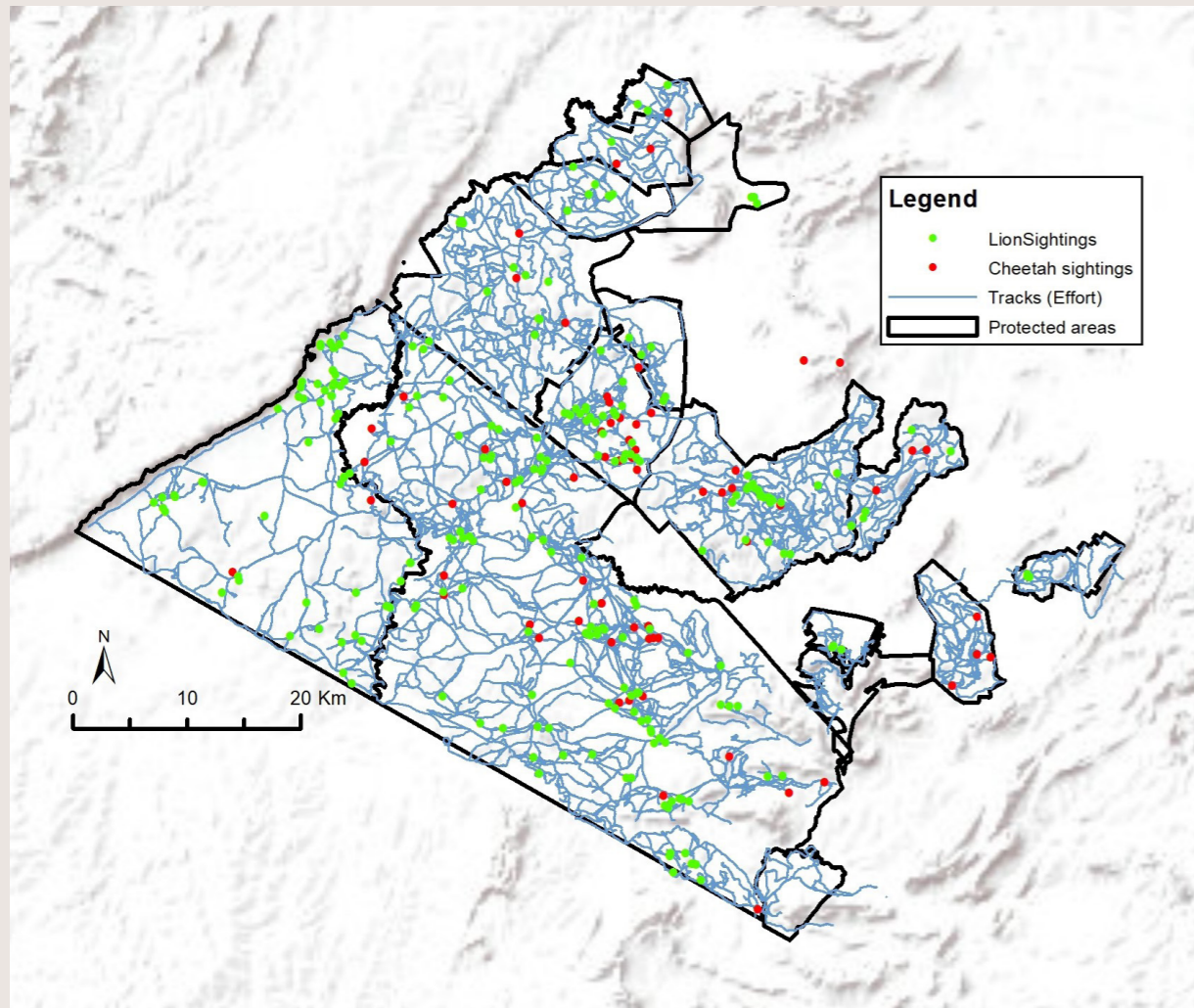

Figure 2. Lion & cheetah sightings overlaid on the 9,287 Km of driven tracks.

The IMS for 2020 was rather unusual in that there were few vehicles driving around due the mass reduction in tourism because of COVID-19. This meant that there were fewer eyes on the ground to help spot the predators. To illustrate this, the graph in figure 3 shows how we achieved our lion and cheetah sightings from 2020, when the vehicles were few, compared to a survey in 2017 when there was a high tourism abundance. As can be seen, more sightings, especially for lions, were made from vehicles at predator sightings in 2017's survey compared to this year.
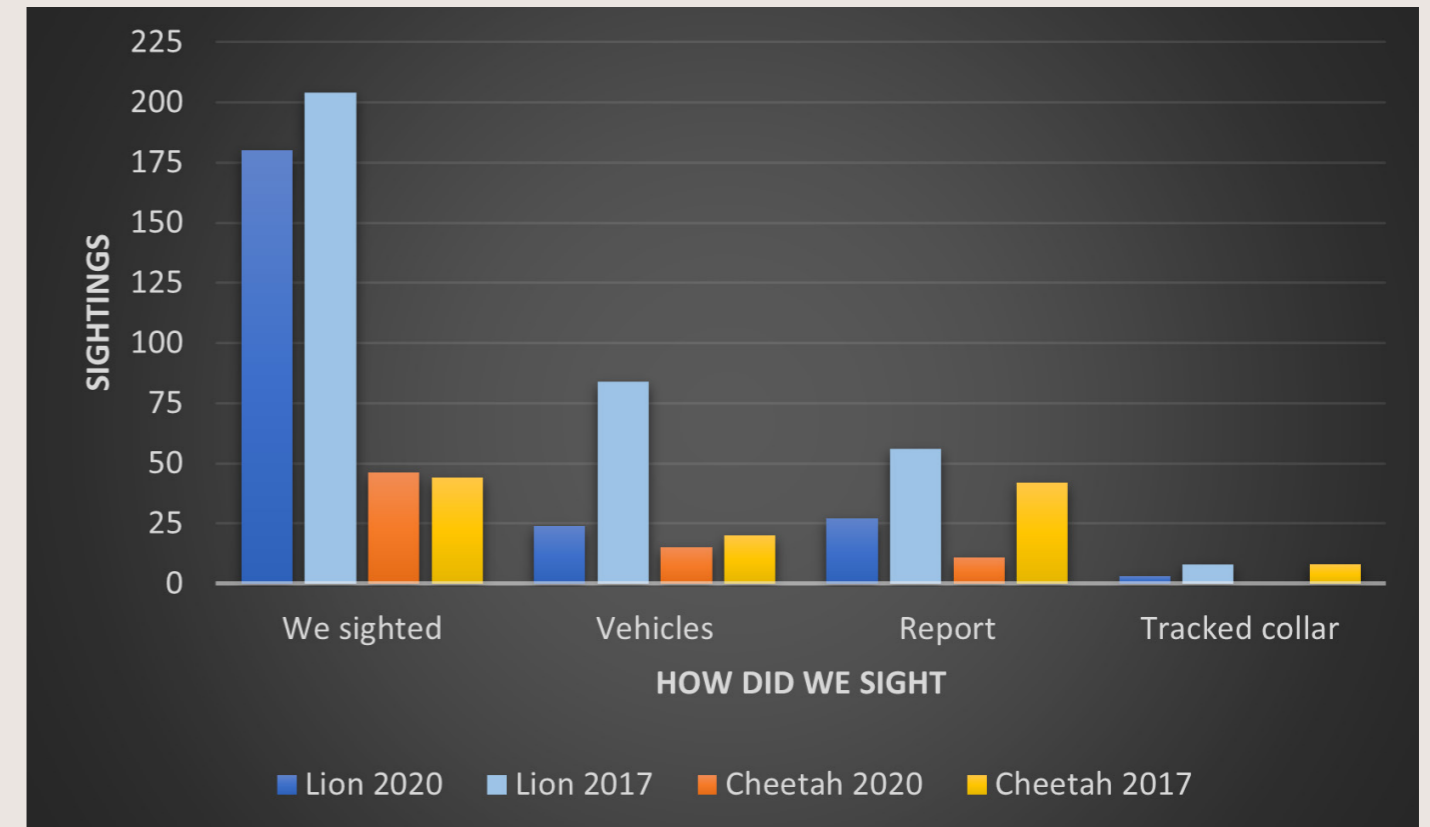

Figure 3. This graph shows how we acquired our lion and cheetah sightings from 2020 compared to a survey in 2017. There are four categories for how we sight a predator: We sighted, sightings from vehicles, sightings from reports and tracking a collar.

To investigate this further, we made a correlation analysis of total lion and cheetah sightings versus sightings by vehicles from all our surveys since 2014, figures 4 and 5. There is a strong positive correlation between both lion (correlation coefficient = 0.81) and cheetah (correlation coefficient = 0.72) sightings and sightings achieved from vehicles. This demonstrates how tourism can be of value to science. However, knowing that there would be fewer vehicles on the ground looking for lions and cheetahs, we increased our own search effort and ended up with a decent number of sightings.
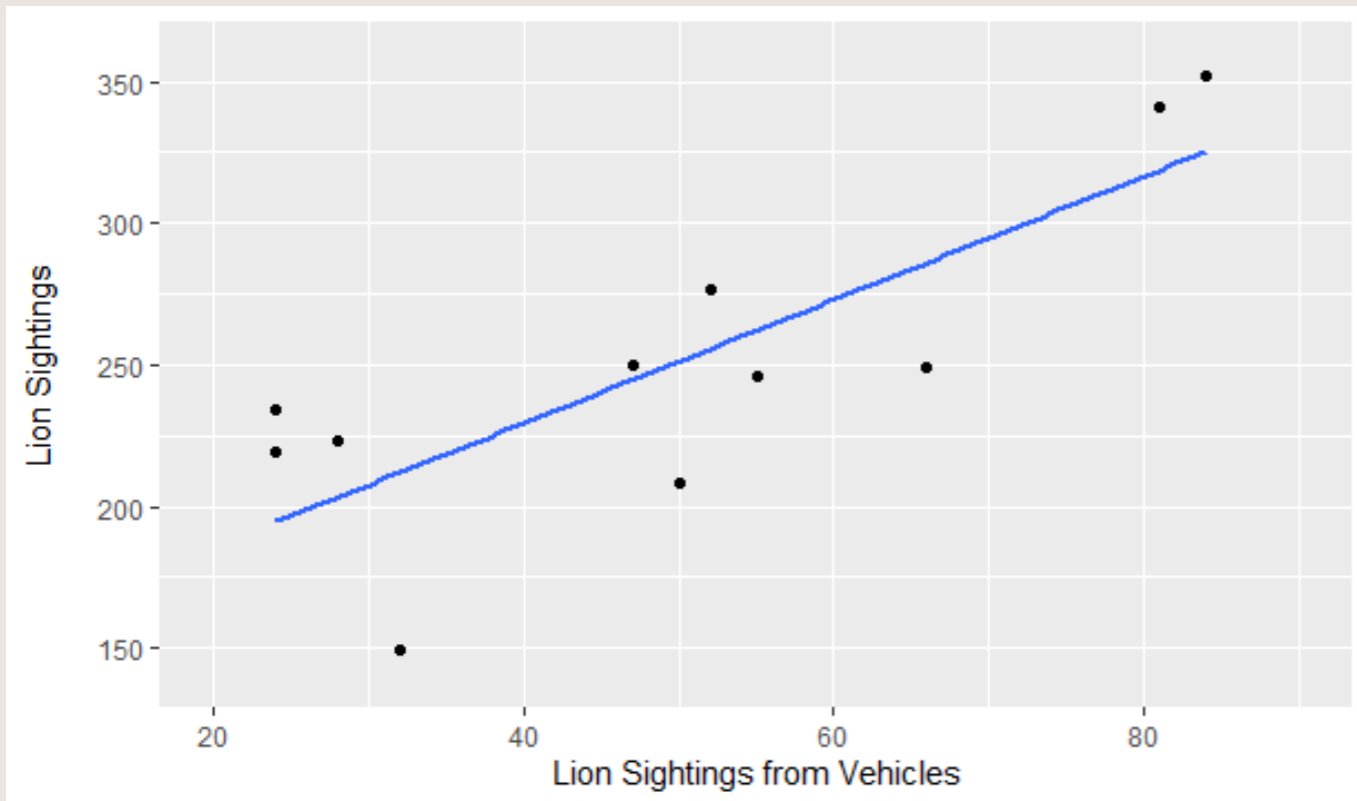
Figure 4. Correlation graph between total lion sightings and sightings obtained from vehicles at a lion sighting.
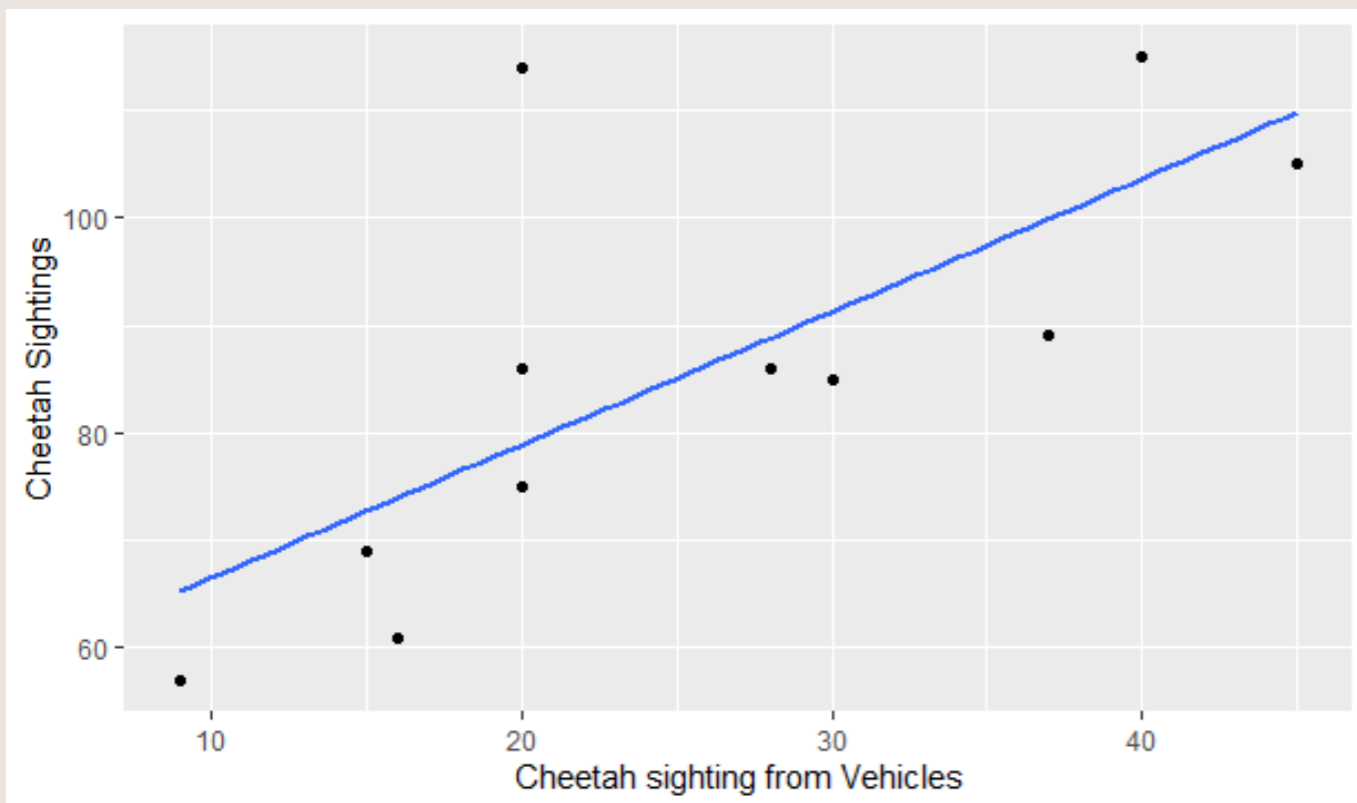

Figure 5. Correlation graph between total cheetah sightings and sightings obtained from vehicles at a cheetah sighting.

Table 1 and 2 summarises the unique individuals of lions and cheetahs that were sighted during the IMS. We found a great deal more unique lion individuals and almost the same number of unique cheetahs from this year's survey as compared to 2019's survey, but it is too early to tell how this will reflect in the density estimates. We will be running the spatially-explicit capture recapture model soon from where we acquire updated lion and cheetah densities and heatmaps. The results will be available in the first quarterly report of 2021.

Search effort (km driven)	Lion sightings	Lion detections*	Unique individuals >1 year old	
9,287 (8,952))	258 (249)	694 (553)	Male	143 (113)
Lions			Female	224 (182)
			Total	367 (295)

Table 1: Summary of lion sightings and numbers during the Aug01-Oct31 2020 survey.
*Lion detections is the total count (including all duplicates) of all lions seen. Numbers from 2019 are in brackets.

Search effort (km driven)	Cheetah sightings	Cheetah detections*	Unique adult individuals	
9,287 (8,952)	78 (89)	142 (192)	Male	21 (26)
Cheetahs			Female	22 (19)
			Total	43 (45)

Table 2: Summary of cheetah sightings and numbers during the Aug01-Oct31 2020 survey.
*Cheetah detections is the total count (including all duplicates) of all cheetahs seen. Numbers from 2019 are in brackets.

LION COLLARING

In 2019, MPCP received a collaring permit from the Kenya Wildlife Service to deploy 10 lion collars on five adult females and five sub-adult males. The collars help us to gain insight into lion's spatio-temporal movements across and onto unprotected land and to document potential conflicts with the local community. With this information, we can provide evidence-based recommendations for management decisions on how to reduce conflicts and decrease lion mortality rates due to such conflicts. The shipment of the collars was delayed due to COVID-19 and we could only initiate collar deployment in June 2020. We succeeded in collaring five adult females and two sub-adult males. Some of our sub-adult male candidates had already dispersed from their pride by the time we were ready to collar, and so we have been forced to postpone further sub-adult male lion collaring until we find other candidates. To be considered a candidate, the sub-adult male has to be between 2.5-3.5 years old, ideally still be with the pride and situated in one of our chosen geographical areas.

Figures 6-10 show the adult female movements overlayed with their 50% Kernel Utilisation Density (KUD), which corresponds to their core usage area. As adult females usually move with their prides, the collared individual movement's represent the prides movements. Figures 11 and 12 show the two sub-adult male movements. As these lions are in the process of dispersing, their core areas are not included. Maasai homesteads are shown where relevant. The figure texts include information on the pride, collar deployment date and interesting observations. We aim to deploy our remaining sub-adult lion collars in 2021.
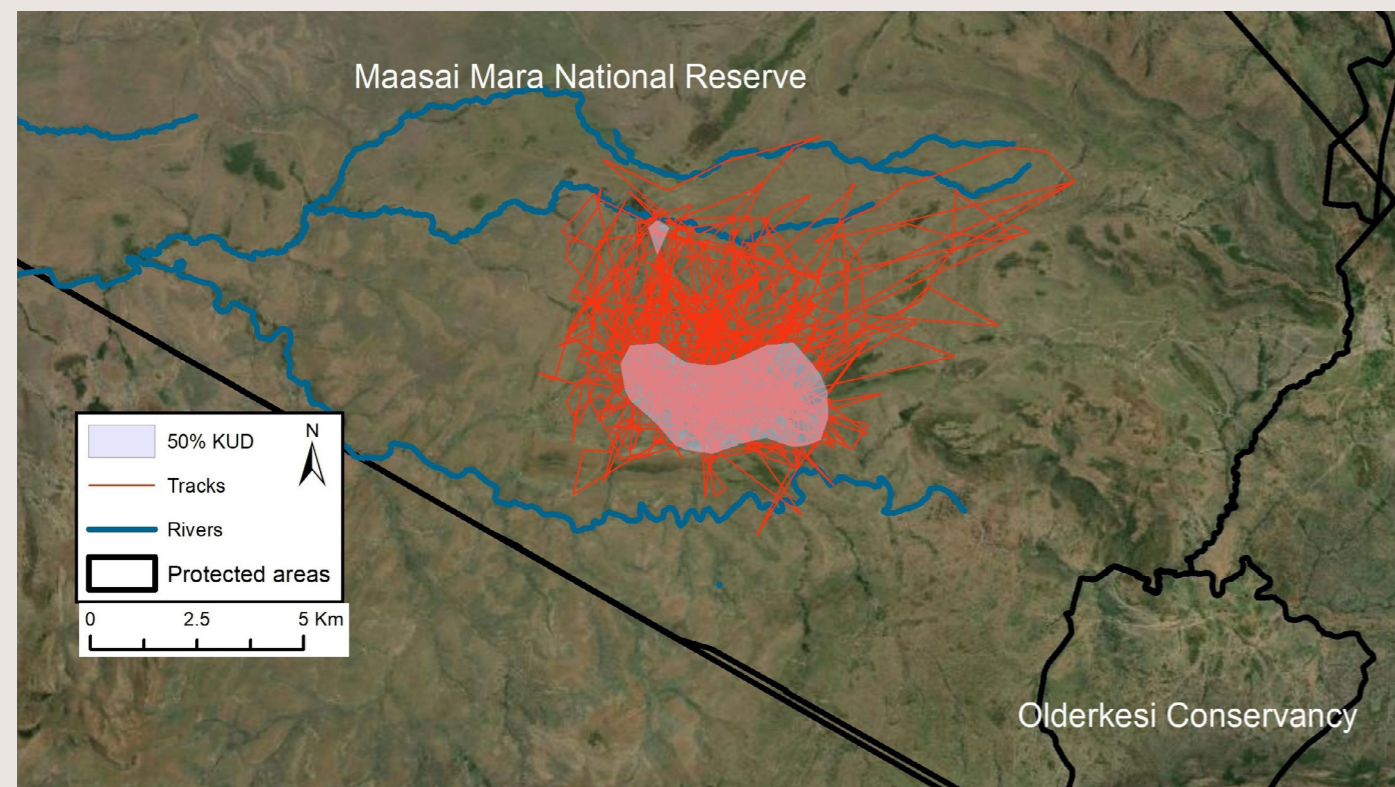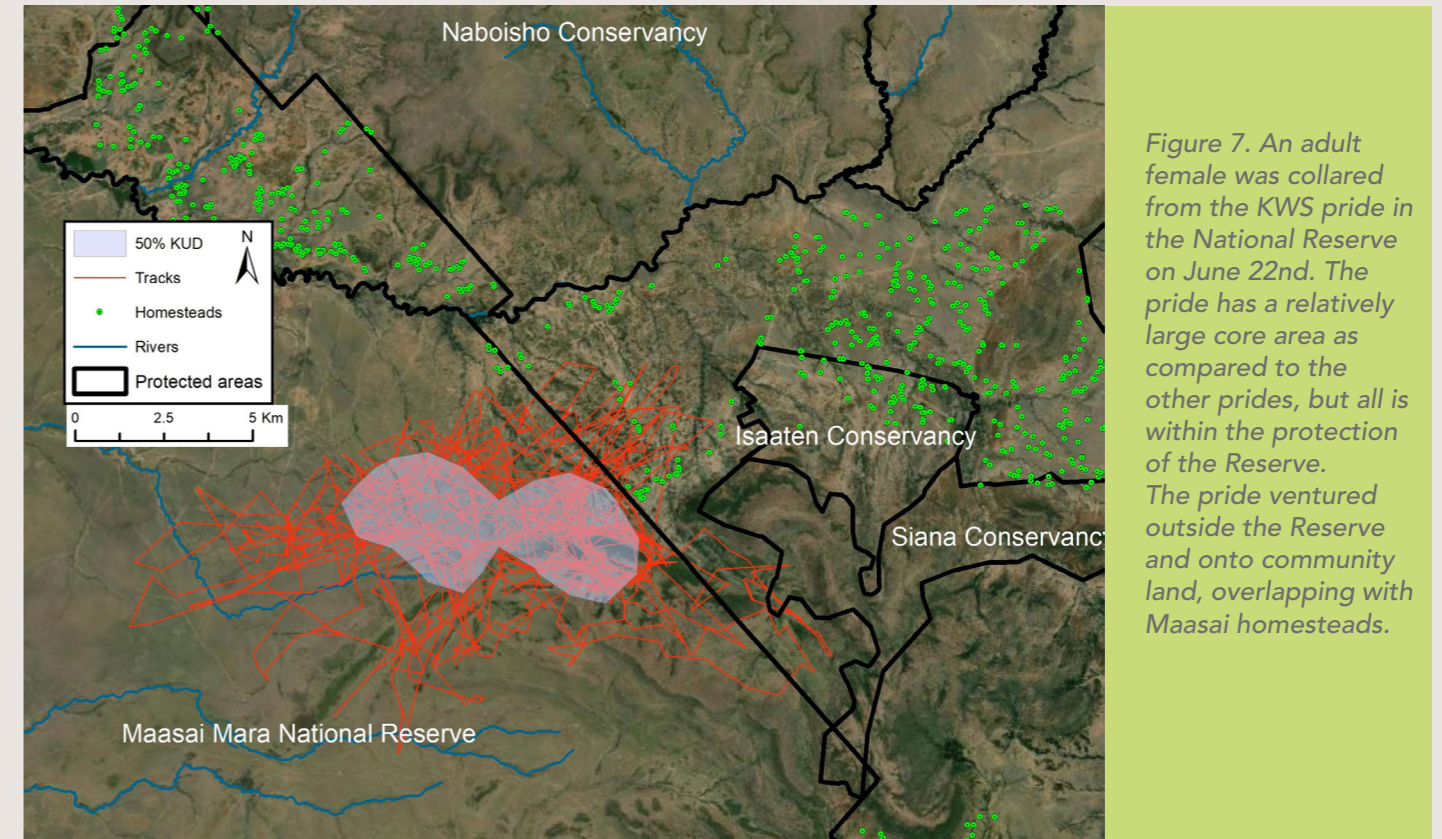

Figure 7. An adult female was collared from the KWS pride in the National Reserve on June 22nd. The pride has a relatively large core area as compared to the other prides, but all is within the protection of the Reserve. The pride ventured outside the Reserve and onto community land, overlapping with Maasai homesteads.

Figure 6. An adult female from the Olooloimatia pride in the National Reserve was collared on August 6th. Their ranging area was still well within the Reserve, most likely due to high prey abundance.
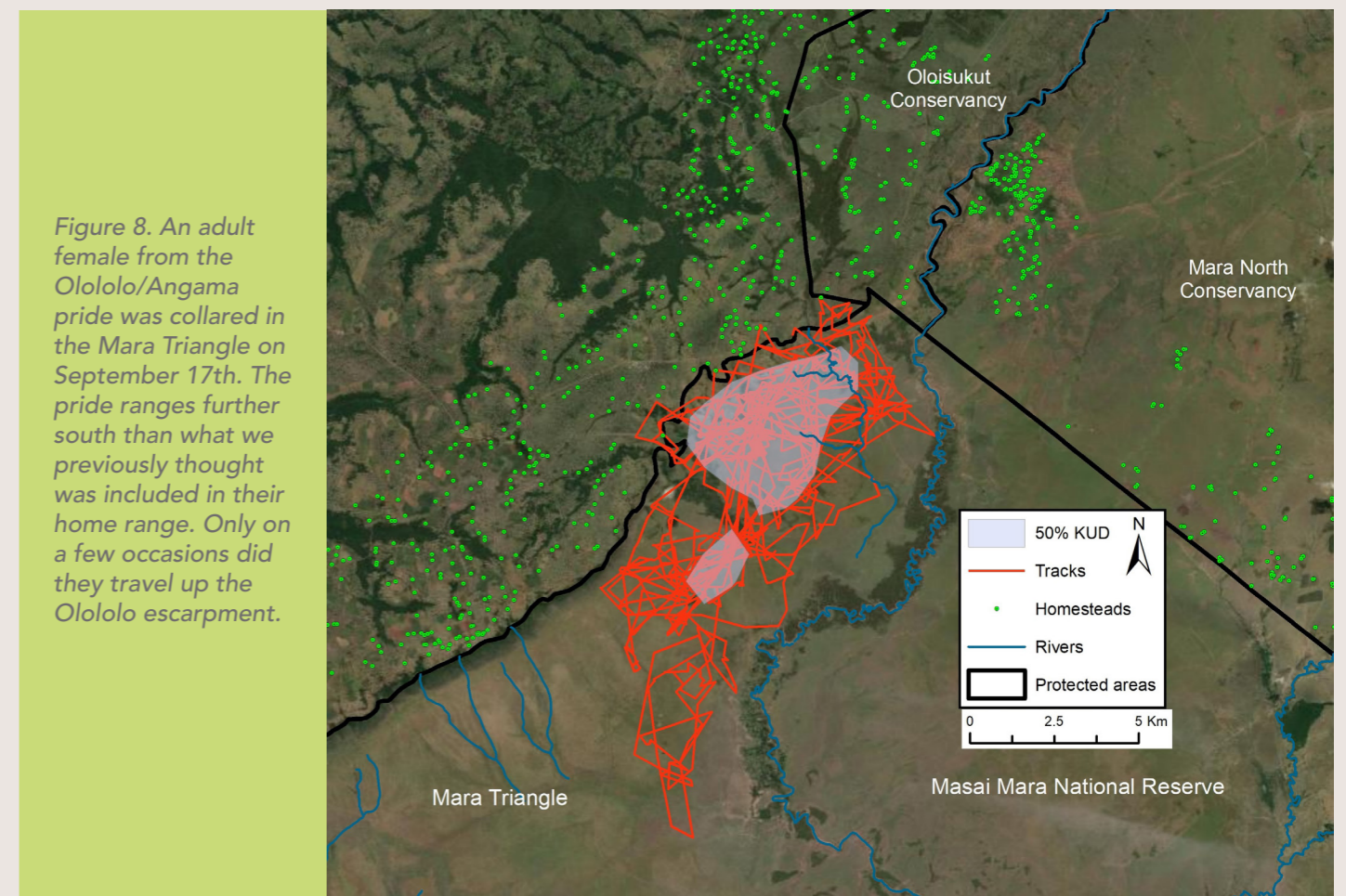

Figure 8. An adult female from the Olololo/Angama pride was collared in the Mara Triangle on September 17th. The pride ranges further south than what we previously thought was included in their home range. Only on a few occasions did they travel up the Olololo escarpment.
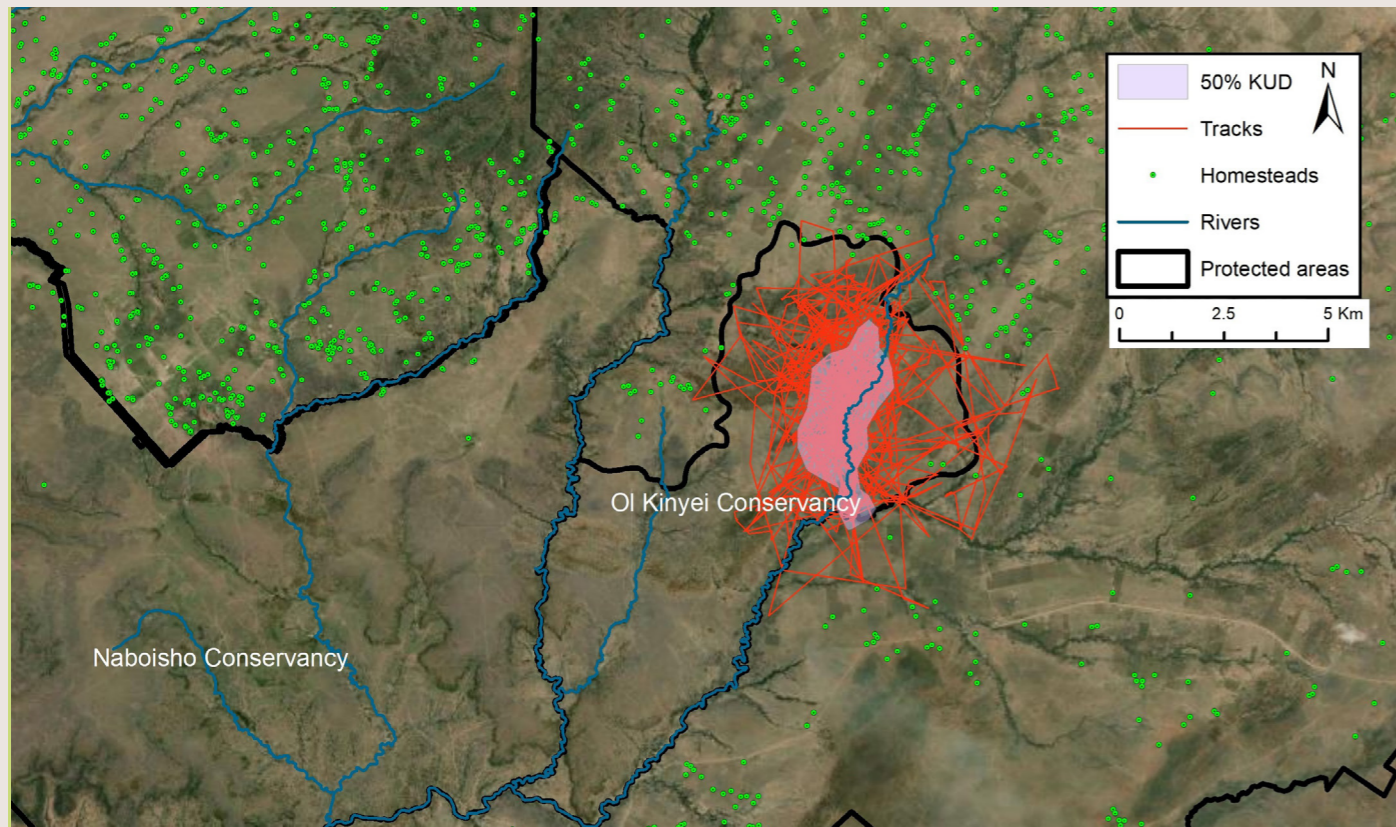
Figure 9. One of the two adult females from the Lemuny pride in Ol Kinyei Conservancy was collared on July 12th. However, the GPS and VHF components failed on November 23rd and we triggered the drop-off mechanism remotely and retrieved the collar. During the four month period of wearing the collar, this lion utilised most of the northern half of the conservancy, spilling out over its boundary to the east. The vast majority of her core area was concentrated along one of the seasonal rivers, which demonstrates the importance of riparian habitat for lions.

Figure 10. The fifth female that was collared was an adult in Olare-Motorogi's Iseketa pride. The collar was deployed on November 18th. A part of this prides core area, and the movements in general, overlaps with homesteads. This knowledge can inform MPCP on where to increase our conservation efforts. The movements extend deep into the Olare Orok part of the conservancy, much to our surprise.
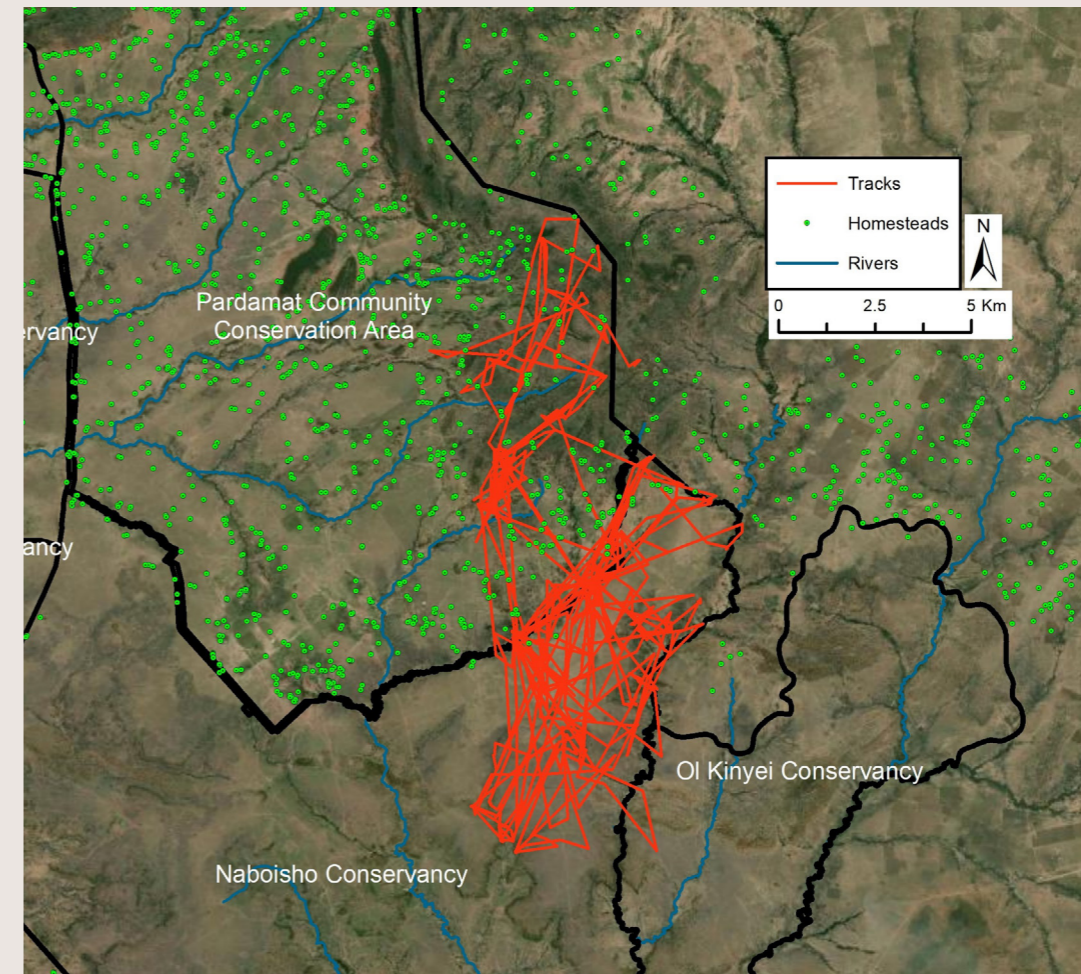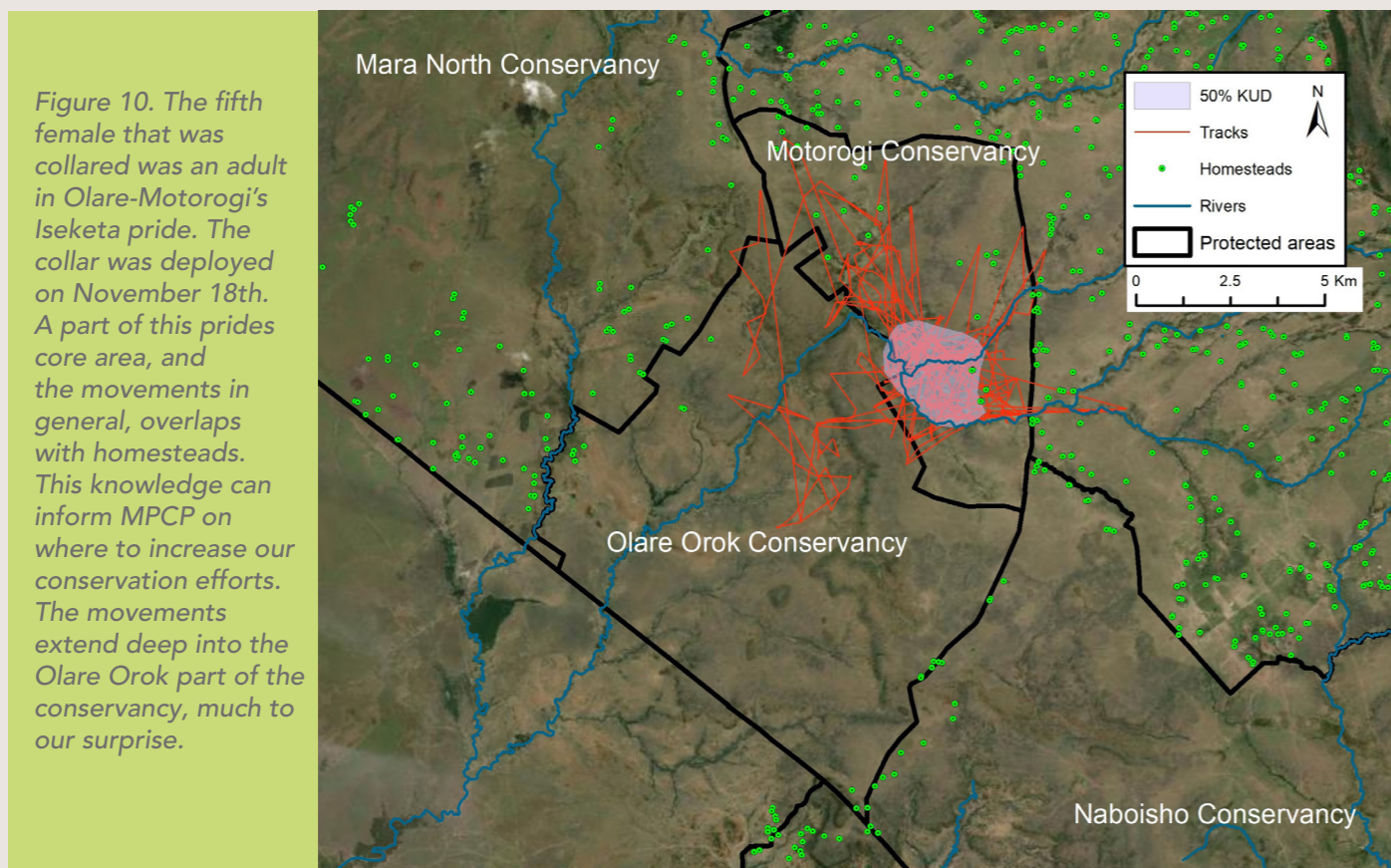

Figure 11. A sub-adult male born into Olare-Motorogi's Iseketa pride was collared in Naboisho Conservancy on October 28th. They were originally six brothers who left their natal pride but only two of them were found in Naboisho. They spent the first few months after collar deployment within the conservancy before continuing their dispersal event into Pardamat Conservation Area. Surrounded by people this is obviously not an ideal place for them to be.
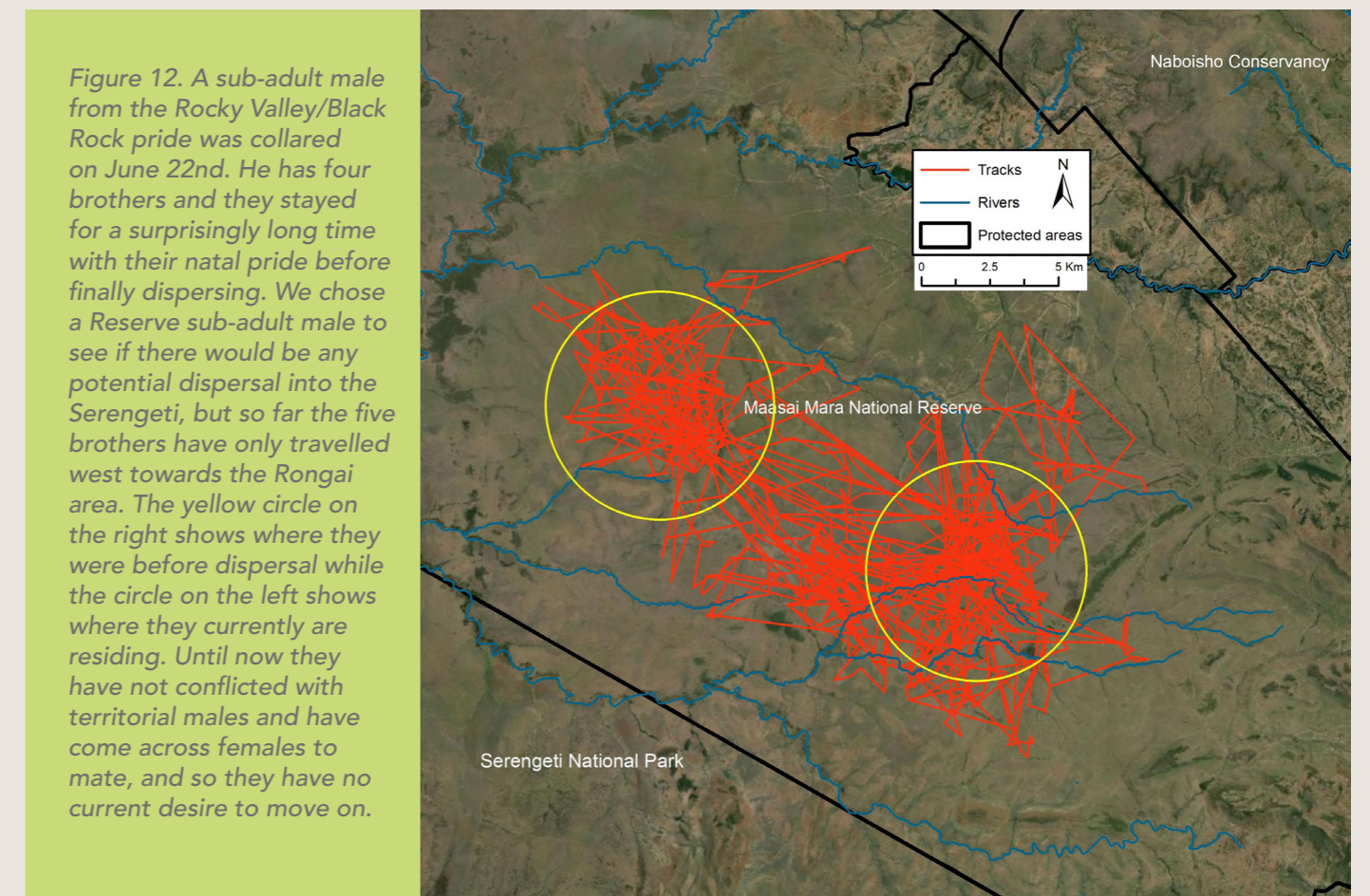

Figure 12. A sub-adult male from the Rocky Valley/Black Rock pride was collared on June 22nd. He has four brothers and they stayed for a surprisingly long time with their natal pride before finally dispersing. We chose a Reserve sub-adult male to see if there would be any potential dispersal into the Serengeti, but so far the five brothers have only travelled west towards the Rongai area. The yellow circle on the right shows where they were before dispersal while the circle on the left shows where they currently are residing. Until now they have not conflicted with territorial males and have come across females to mate, and so they have no current desire to move on.

CHEETAHS

CHEETAH DEMOGRAPHICS

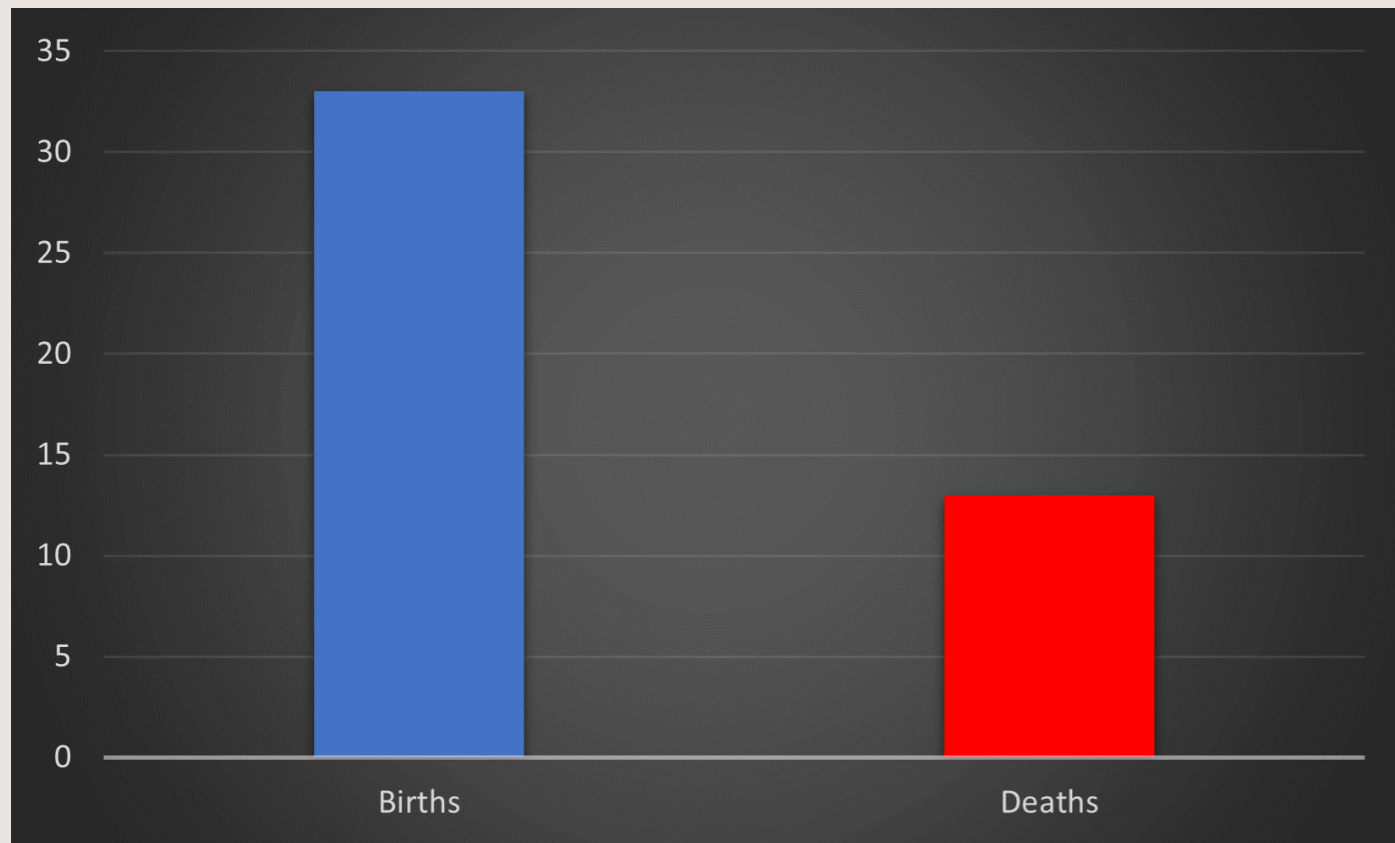In 2020 we recorded 10 mothers giving birth to 33 cubs whereof 13 have died (figure 13).

Figure 13. Births and deaths of cubs in 2020.

To get an overview of Mara cheetah demography, we have analysed our cheetah data since we began monitoring cheetahs in June 2013, which is illustrated in table 3 and figure 14.

Average dispersal age (Months)	Male dispersal groups	Groups accounted for in 2020	Groups unaccounted for (1 group confirmed dead)
16	35	10	25

Table 3. This table shows Mara cheetah dispersal figures from June 2013-December 2020.

The average dispersal age is on the lower side when compared to other cheetah populations, where it is typically 18-22 months. The Mara has a very high number of male coalition groups that have disappeared and the big question is what is happening with this demographic? For example, are they successfully dispersing to, and settling in, other areas in the Greater Mara Ecosystem or are they being killed in the process. Causes of death could either be natural or anthropogenic. These questions can only be answered by deploying GPS collars on dispersing males, which is something that might achieve in the future.
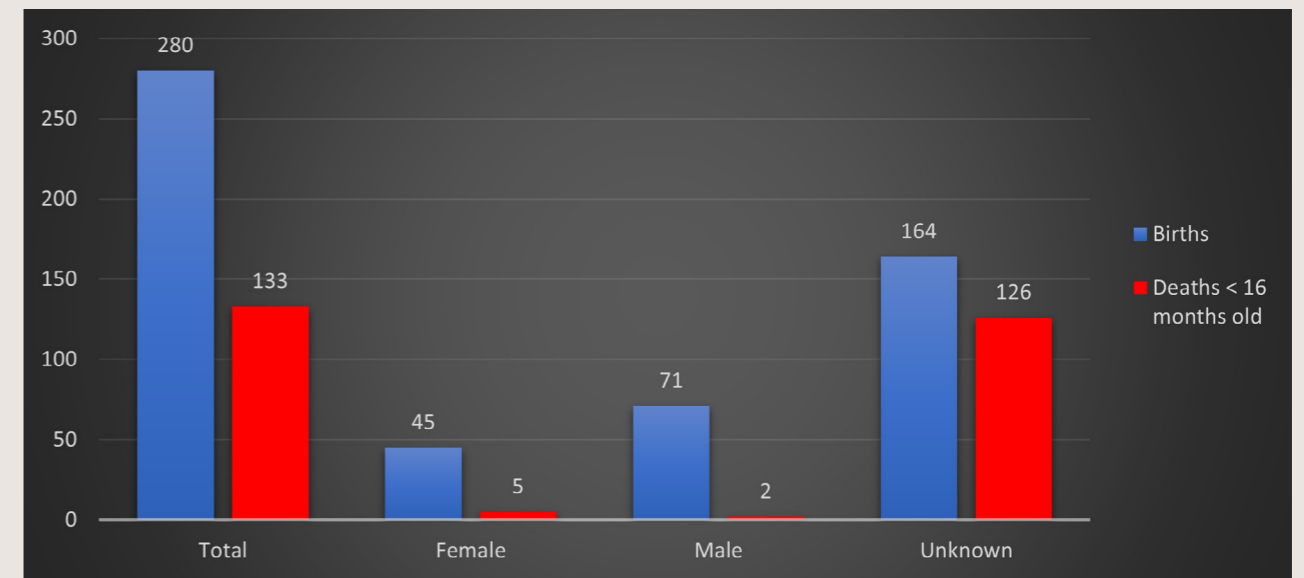

Figure 14. The graph shows the number of cheetahs born in the Mara from June 2013 to December 2020 and the number that have died before reaching 16 months of age. 16 months was used as this is the average dispersal age, i.e. age of independence (see Table 3). Most of the cubs died before we were able to sex them, hence the high number of unknown sexes.

The overall mortality rate is 48% (39% for cubs born in 2020), which may seem low. The mortality rate for cheetah cubs in the wild is normally around 70 percent. However, as we only see new cubs for the first time when they are taken out the lair at ca. two months of age, we do not know the exact number of cheetahs actually born and the mortality within the first two months is high, as reported elsewhere in cheetah populations. Therefore, we can only say that the mortality rate for Mara cheetahs for the period of two months of age to the average age of independence is 48%.

NEW INDIVIDUALS

In 2020 we recorded three new individuals, two males and one female, which have been added to our database. One male was caught by a camera trap in the Lemek hills while the other male, named Oloti, first appeared in the Mara triangle before crossing over to the Reserve side. The female appeared towards the end of the year in the southern part of the Reserve and so it is likely that she originated from the Serengeti.

Figure 15. The new male Oloti

A NEW CHEETAH PUBLICATION

A scientific article in the journal of Ecography was published in the fourth quarter of 2020. We investigated how cheetahs respond to prey pulses using four years of our cheetah data spanning from 2015-2018. We found that responses were sex specific: females congregated in areas of high prey abundance and males exhibited larger movements during the migration when prey were dispersed. An overview of the paper is illustrated in figure 16. The full article can be accessed through this link https://onlinelibrary.wiley.com/doi/full/10.1111/ecog.05154
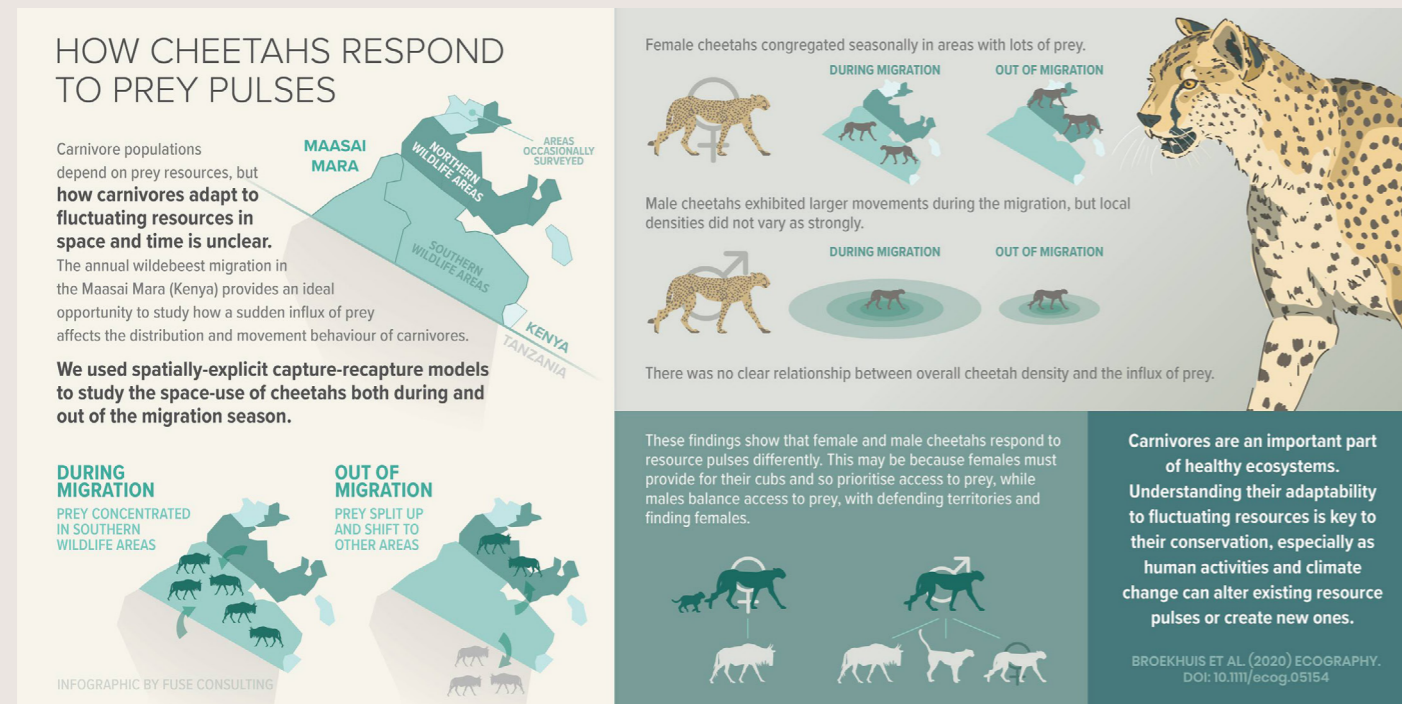

Figure 16. An overview of a recently published paper on how cheetahs respond to prey pulses.

WILD DOGS

We recorded 34 wild dog sightings using our Cyber Tracker app in 2020 as shown in figure 17.
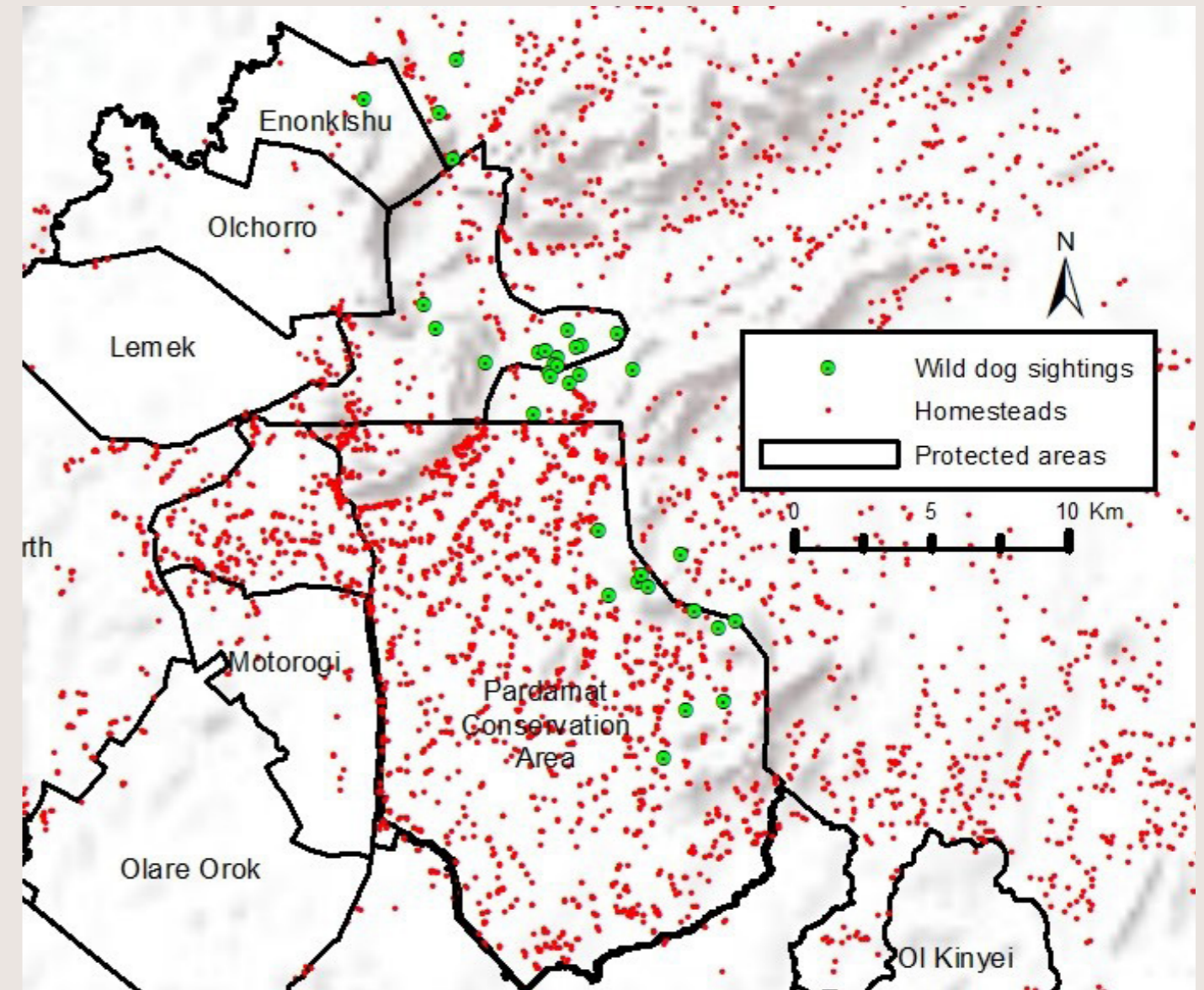

Figure 17. Wild dog sightings overlaid with homesteads.

Our camera traps continue to capture wild dogs, including a photo of the pregnant alpha female from the Pardamat-Lemek pack, figures 18 and 19. Of the nine pups that were born in August 2019, eight survived their first 18 months of age, which is quite an achievement.

Figure 18. The alpha female from the Pardamat-Lemek pack.

Figure 19. Members of the Pardamat-Lemek pack

A new group of four females with an unknown origin, appeared in Enonkishu Conservancy in July. In December, the four females were seen together with four males from the Pardamat-Lemek pack in Olchorro Conservancy, and later together in Enonkishu Conservancy. This is really exciting and we hope that they will establish a new pack in that area, figure 20.

Figure 20. The group of four new females

Human-wild dog conflicts increased in 2020 around the areas utilised by the Lemek-Pardamat pack. Wild dogs were reported to have killed sheep and goats and they targeted homesteads with poor herding practices. Figure 20 displays the recorded conflicts caused by wild dogs during the year. It is likely that this is only a fraction of all the livestock lost to conflicts as many incidents are not reported.
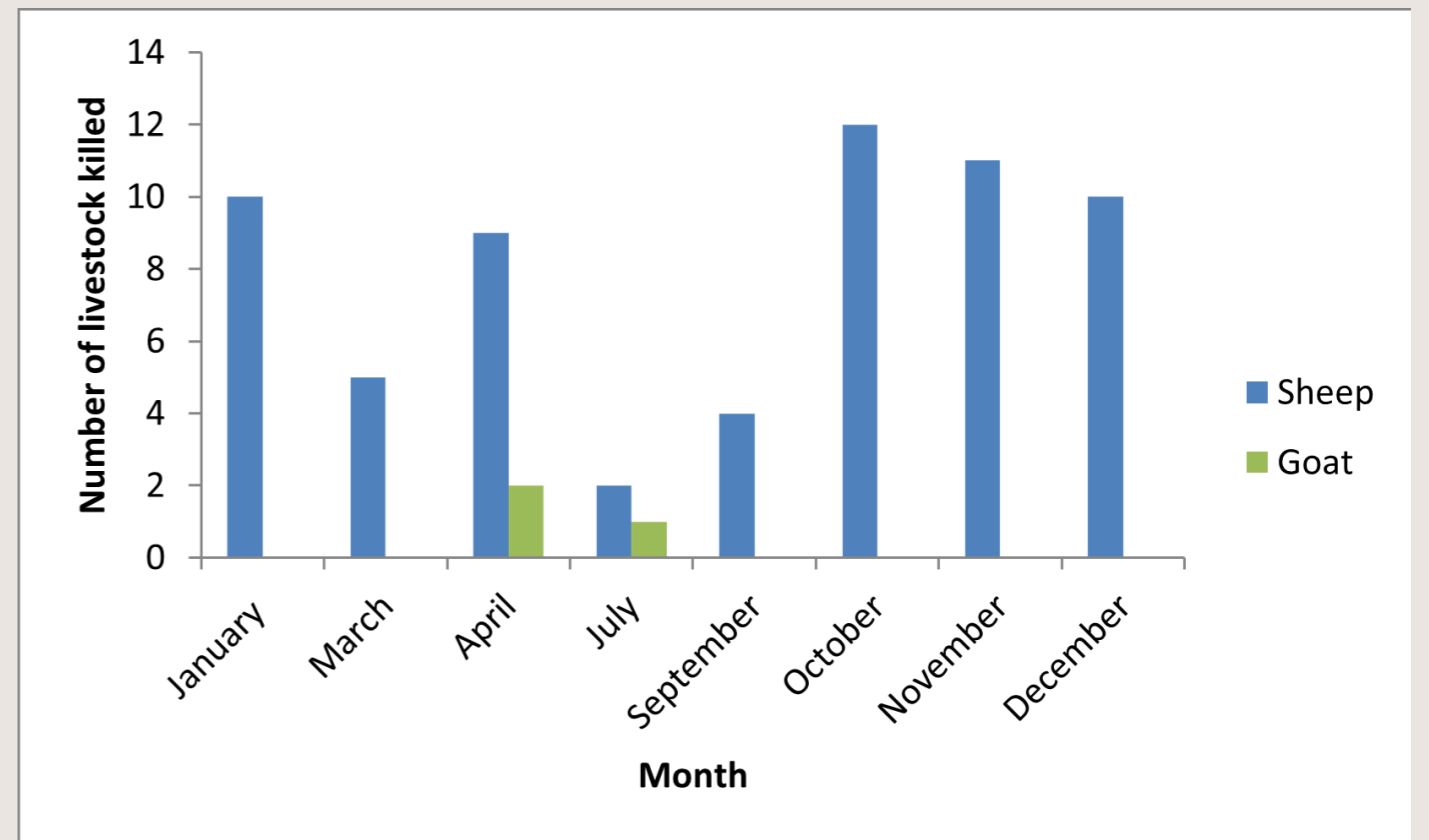
Figure 21. Sheep and goat predation by wild dogs in 2020.

LIVESTOCK ACTIVITY

We continue to record livestock numbers during our intensive monitoring sessions. Figures 22 and 23 show the densities of cattle and shoats (sheep + goats), respectively. The pressure from livestock varies considerably from the different management units.

Figure 22. Cattle kernel density map. The density is based on cattle sightings, correcting for distance driven (effort).

Figure 23. Sheep and goats (shoats) kernel density map. The density is based on cattle sightings, correcting for distance driven (effort).
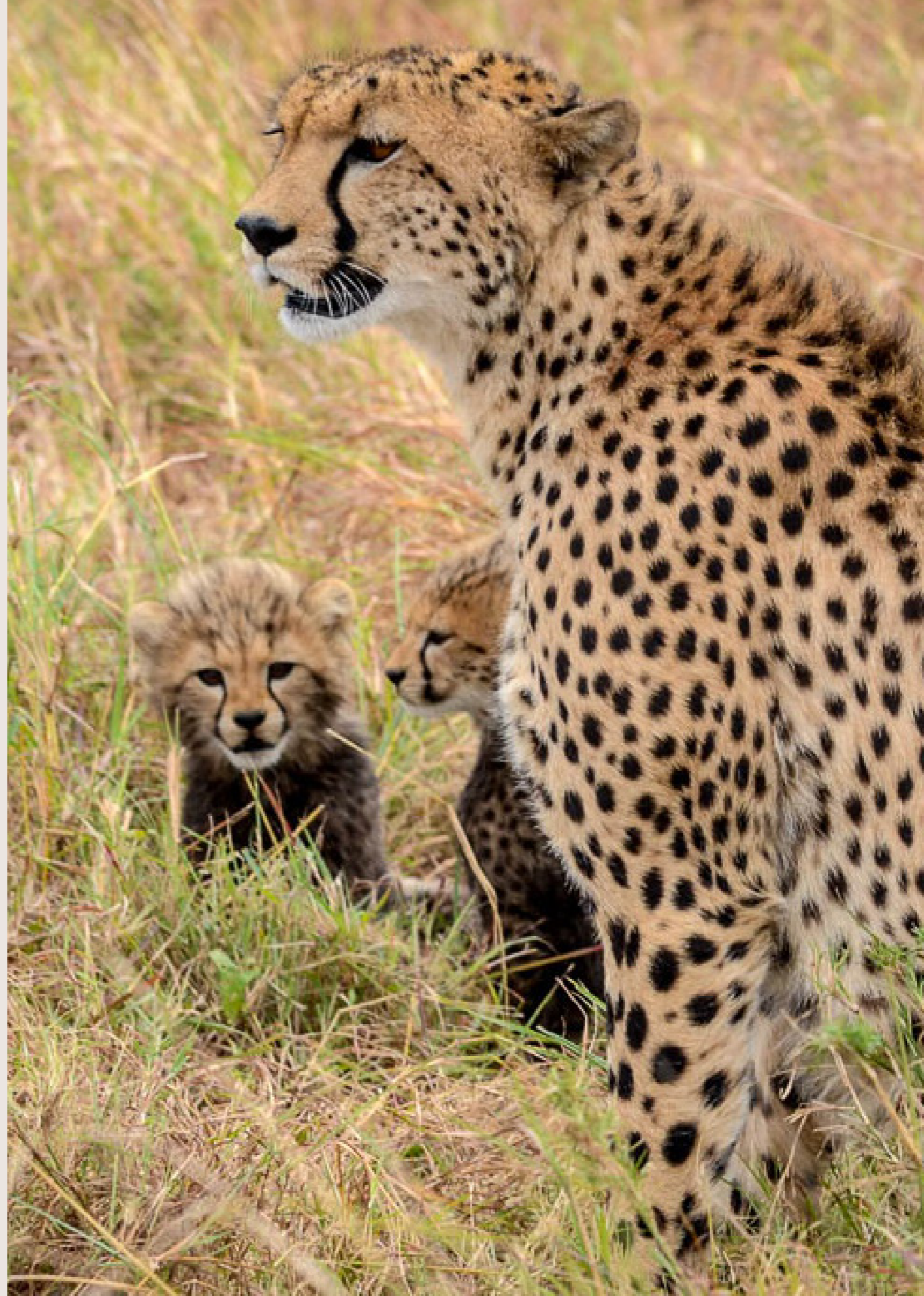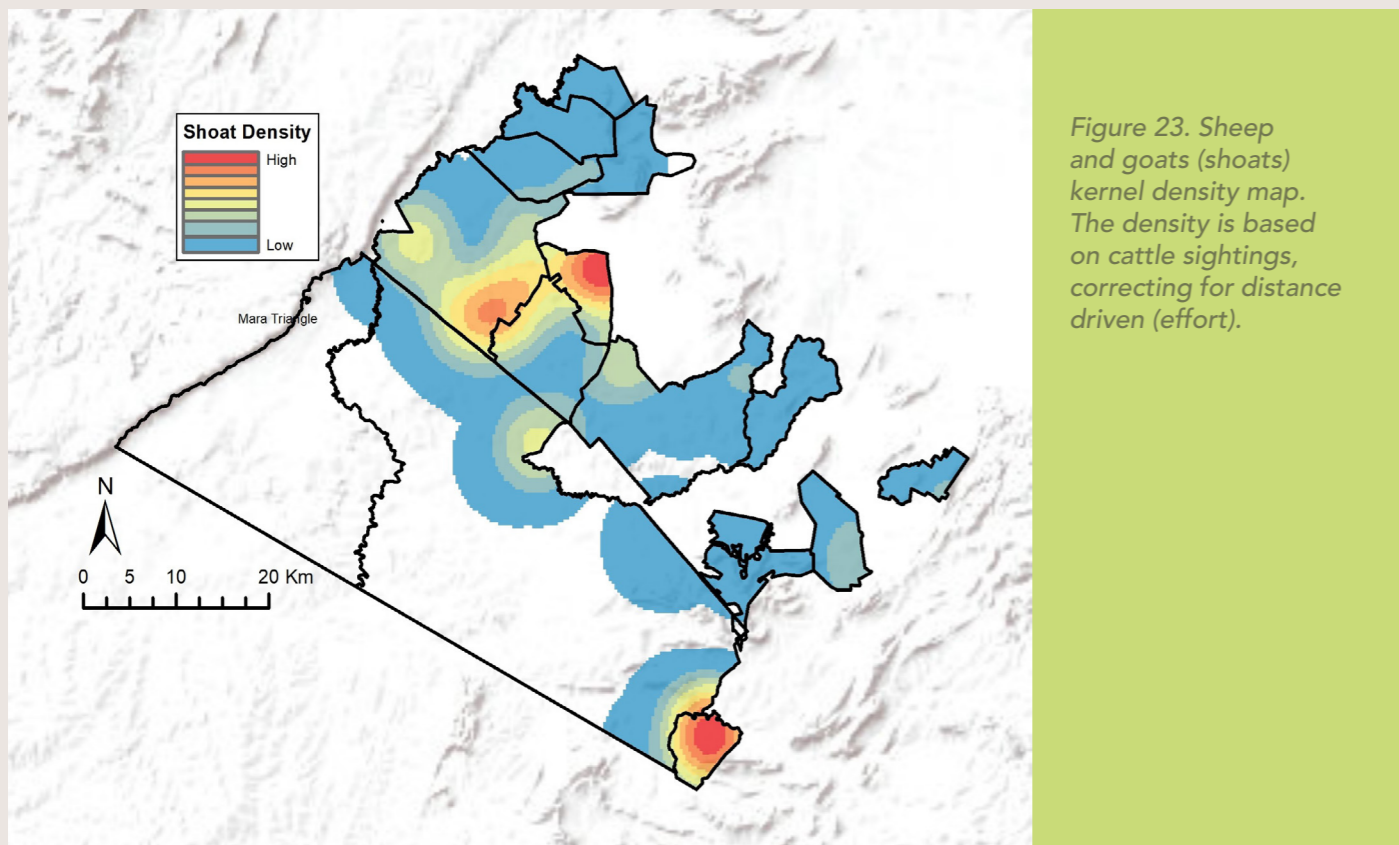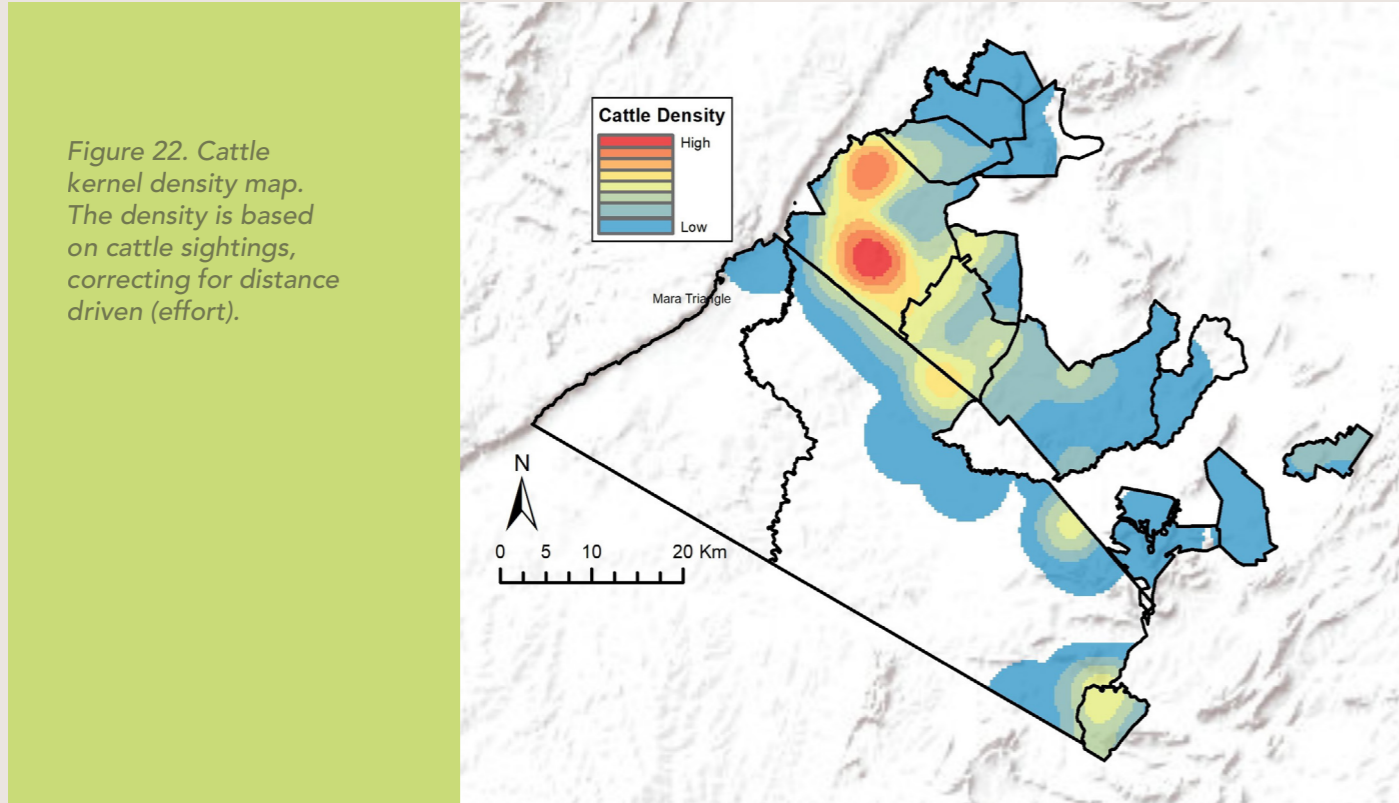
COMMUNITY UPDATE

COMMUNITY OUTREACH AND EDUCATION

Mara Predator Conservation Programme's community outreach focuses on three key objectives; human wildlife conflict mitigation, community outreach and conservation education in primary schools. During the year 2020, significant progress was achieved in each of the three objectives as discussed below.

HUMAN WILDLIFE CONFLICTS MITIGATION

The Mara ecosystem continues to grapple with increasing numbers of Human wildlife conflict incidents due to the close proximity between predators and people. MPCP through its Lion Ambassador Programme has identified three new conflict hotspots discussed later in the report. This year, the MPCP team has continued to work with communities in mitigating these conflicts through adoption of various measures to enhance coexistence efforts. These measures are discussed further below.

RECYCLED PLASTIC POLES BOMAS

Recycled plastic poles bomas are an innovative and eco-friendly conflict mitigation strategy that MPCP initiated in 2017. This year, we constructed thirty-two (32) new plastic poles bomas in five conflict hotspot areas (Siana, Trans-Mara, Pardamat, Talek and Rekero). The construction of these bomas has led to protection of more than 3200 heads of cattle and improved tolerance towards predators by communities around these hotspots.

Figure 24: Livestock inside one of the Recycled plastic poles bomas constructed at Meguarra area closer to Siana conservancy

PREDATOR DETERRENT LIGHTS

Predator deterrent lights have been found to be effective in dissuading attacks of bomas at night in other parts of Kenya[1]. During this reporting period, MPCP purchased 300 lights which will be installed in 30 bomas across the Mara and their efficacy measured in order to help enhance livestock security and tolerance towards predators.

BOMA REINFORCEMENTS

The increase in conflict hotspot areas and reduction in funding available to implement a boma reinforcement programme (Due to COVID-19), has greatly impacted our ability to support more community members with poorly built bomas. This year we managed to support four families (through issuance of triple twist chainlinks) which were adversely affected through losing many livestock to predation. The four families were based at Enkeju enkoirien and Enchorro o sidan areas.

Figure 25: MPCP's community team delivering boma reinforcement materials to one of the beneficiaries at Enchorro o sidan

1   LESILAU F, FONCK M, GATTA M, MUSYOKI C, VAN 'T ZELFDE M, PERSOON GA, ET AL. (2018) EFFECTIVE-NESS OF A LED FLASHLIGHT TECHNIQUE IN REDUCING LIVESTOCK DEPREDATION BY LIONS (PANTHERA LEO) AROUND NAIROBI NATIONAL PARK, KENYA. PLOS ONE 13(1): E0190898. HTTPS://DOI.ORG/10.1371/JOURNAL.PONE.0190898

COMMUNITY OUTREACH

Engaging communities through awareness creation forums is a core component of our outreach. MPCP strongly believes in working with communities to increase their understanding of predators as well as their capacities to respond to conflict incidents to promote coexistence. This year, the MPCP team carried out various activities as outlined below.

LION AMBASSADORS

The Lion ambassador programme is a new and exciting initiative aimed at increasing Lion conservation footprint across the Mara ecosystem. MPCP initiated this programme by recruiting ten community members in ten selected areas bordering conservancies and the Maasai Mara National Reserve (see Fig 26). Through this initiative, response to human wildlife conflicts has been enhanced and data collection on variables in the ecosystem that affect predator conservation and coexistence have been boosted. Through this initiative, the interaction with other stakeholders in the Mara have been improved making collaborative conservation easy. Some of the key outputs of this Programme include: a mapping of 4,628 settlements in the area as depicted in Figure 26 of the area, a realization of four new conflict hotspots (Rekero, Pardamat hills & Kishermoruak) and, increased engagement with livestock herders leading to the prevention of predator attacks.
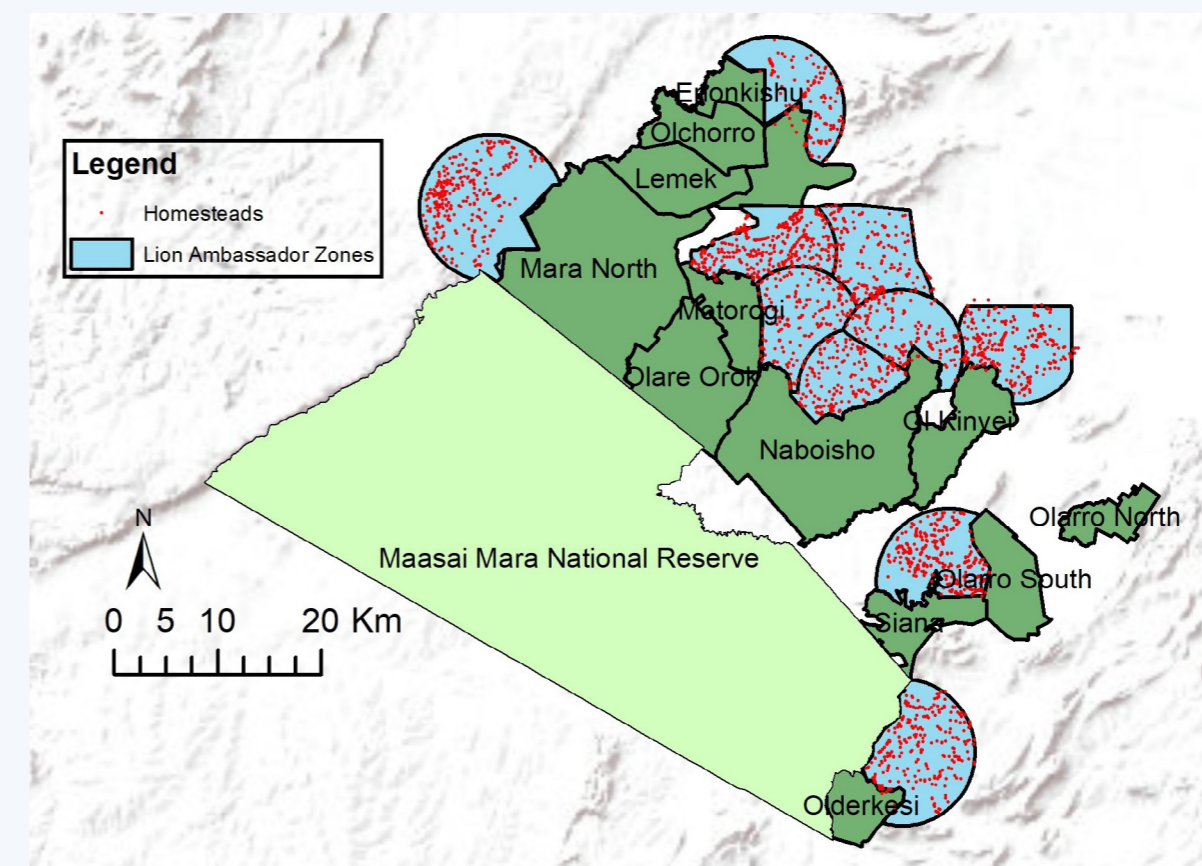

Figure 26: Map of settlements in the ten zones where the lion ambassadors work

COVID-19 KINDNESS

The outbreak of COVID-19 brought a myriad of challenges to the Mara ecosystem and also affected our work plans leading to a shift in focus. The closure of schools and government restrictions on public gatherings influenced a shift in resources to support communities in responding to COVID-19. MPCP purchased and distributed one hundred and seventy (170) hand washing kits to help enhance hand washing by communities. The kits were distributed to health centers, cultural villages, community waterpoints and other public areas. In addition, MPCP designed and printed posters and translated them into the local language to help create awareness on the seriousness of the disease as well as tips to avoid the spread of it.

Figure 27: Rangers from Olare-Motorogi conservancy receiving hand washing kits from MPCP team

POISON RESPONSE TRAINING

Wildlife poisoning still remains a big threat to the survival and thriving of predators (including birds of prey) in the Mara. In response to this, MPCP works to create awareness and enhance response through establishing network groups to assist in curbing the spread of poisoning incidents. During this period, five training sessions were held in five hotspot areas (Oloisukut, Pardamat, Endoinyo Narasha, Nkoilale and Oloolpopong) where sixty-four community members were trained on how to respond to wildlife poisoning. The participants were encouraged to reach out to other community members to multiply personnel available to respond to such incidents as well as discourage people from poisoning predators.

Figure 28: Participants from Oloolpopong area in Oloolaimutia keenly follow proceedings during the poison response training

MPCP EVALUATION

MPCP held its first evaluation exercise for community outreach activities during this period. The exercise was aimed at gaining insight into the impacts of various activities implemented with different target groups, document key successes, address the gaps and formulate strategies aimed at improving the performance of the organization into the future. A mixed method approach was adopted to capture the different categories of people in the community who are targeted using various interventions. Questionnaire surveys, Focus Group Discussions (FGDs) and observations were used to gain in-depth information during the exercise. The findings from this exercise provided insights into ways to make our outreach activities more impactful communities

WILDLIFE CLUBS

MPCP has continued to work with nine schools in the Mara to implement conservation education in the Mara. The nine schools with 347 club members have helped enhance the spread of conservation knowledge across the Mara as a result of knowledge sharing between club members and their communities. The outbreak of Coronavirus this year led to the closure of schools from March to the end of the year. MPCP had to come up with creative ways of engaging club members even while at home. Highlights of activities conducted during this period are discussed below.

GAME DRIVES

MPCP together with wildlife club patrons and parents, organized game drive for one hundred wildlife club members from four villages (Kolong, Mbitin, Irbaan and Olkurroto) where twenty-five members were selected based on availability in every village and were taken for game drives at Maasai Mara National Reserve and Naboisho. During these trips, all COVID-19 regulations (social distancing, face masks and hand sanitizers) were observed to ensure the safety of children. These game drives provided a welcomed break from the long holiday while also encouraging the children through learning more about wildlife to reinforce positive attitudes.

Figure 29: Wildlife club members during a game drive in Maasai Mara National reserve

TIPPY TAPS

One of the key activities that the children were engaged during this period was building of tippy taps, a handwashing kit that is homemade with a complete hands-free operating mechanism (Figure 30). The aim of this is to enhance access to safe hand washing facilities which reduce the spread of the pandemic. Selected club members were given printed materials with illustrations on how to build the tippy taps (tippytapp.org) and encouraged to use locally available materials to put them up. A total of one hundred tippy taps were put up in five villages supporting over three hundred residents in hand washing to prevent the spread of COVID-19.

Figure 30: Pardamat Conservation Area manager washing hands on a Tippy tap put up by wildlife club members in a village at Endoinyio-Erinka

WILDLIFE CLUB BOOK

While grappling with the impacts of school closure due to the COVID-19 restrictions, we worked to find ways of adapting and improving on education and outreach to our supported wildlife club members.

One of the initiatives we came up with was to develop a wildlife club book titled "Ole Peenko's Journey and Other Stories". The book features conservation themed stories that revolve around human-wildlife co-existence. It also has interactive games that keep the children engaged.

The publication of the first edition of the book was sponsored by Asilia and the distribution of the books was started in December 2020 and the rest were distributed in January 2021.
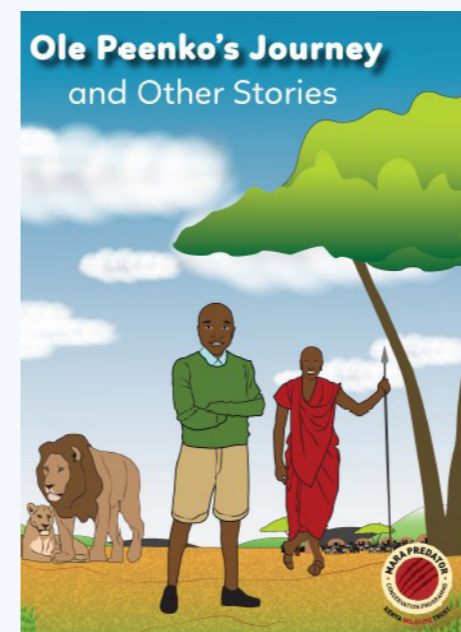

Figure 31: Left cover for the wildlife club book. Right wildlife club members sample their copies of the wildlife club book

WILDLIFE CLUB MATERIALS AND CALENDARS DISTRIBUTION

During the year MPCP Purchased more than 100 conservation textbooks and art work materials to help wildlife club members learn about conservation during the COVID-19 holiday. In addition, MPCP distributed 100 calendars which carried messages on wildlife club activities to schools, clinics and dispensaries in an effort to create awareness about wildlife clubs that MPCP support.

Figure 32: Wildlife club members in Kolong village pose for a group photo after receiving wildlife club reading materials.

APPENDIX
WEATHER

We recorded a total of 1,747 mm of rain from the Predator Hub's weather station, figure 33. This is the highest amount of annual rainfall recorded since we started monitoring rainfall in 2013.
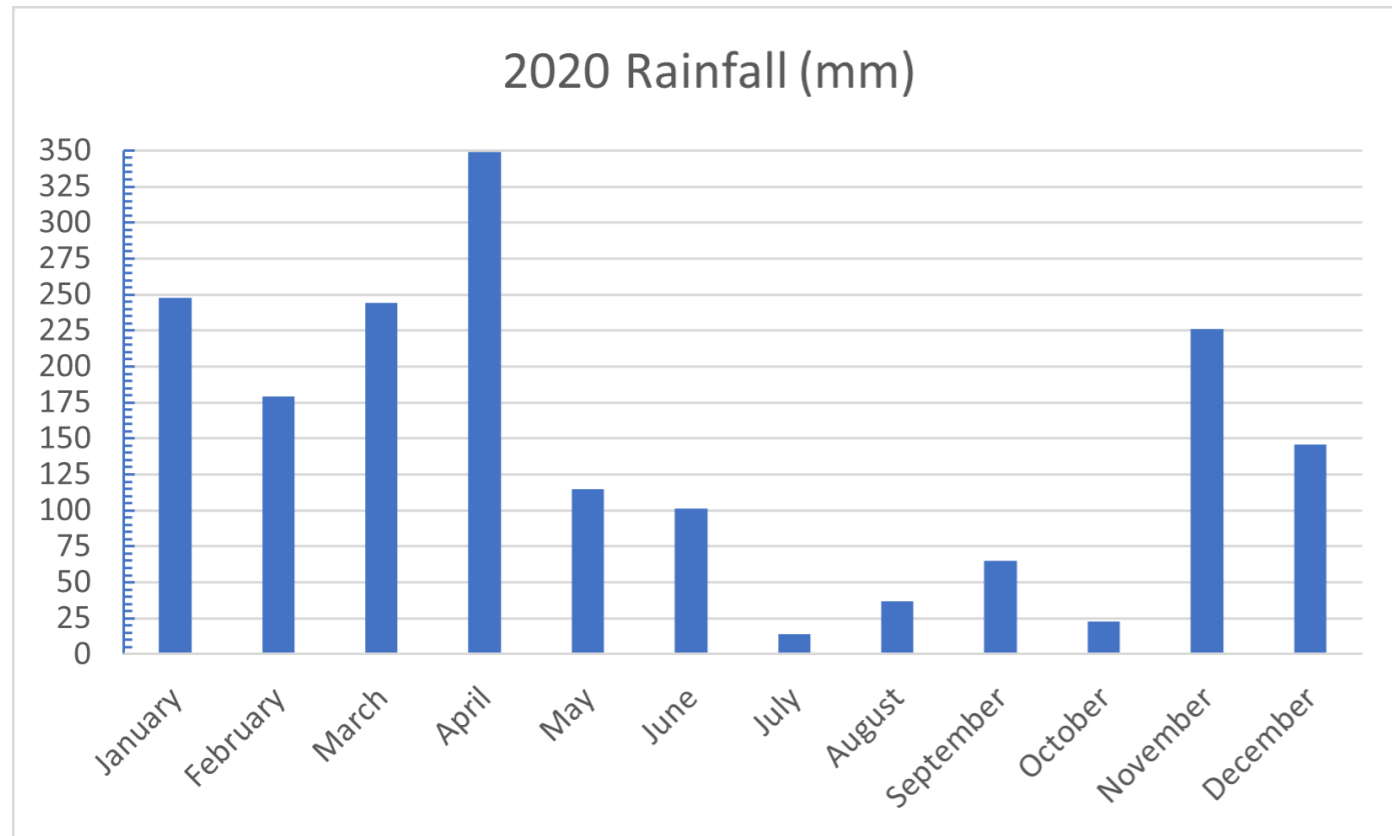

Figure 33: 2020 monthly rainfall.

ACKNOWLEDGMENTS

Our 2020 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 particular, we are extremely grateful to the following organizations for their support.

Mara Predator Conservation Programme
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