

Science & Outreach 2023



MPALA

Research • Conservation • Community



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About Mpala Research Centre



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Mpala Research Centre is one of the world's leading field-based research centers located on a breathtaking 48,000-acre campus in Laikipia County, Kenya. As a US-Kenyan collaboration, with backing from some of the world's most important research organizations, Mpala is distinctively situated to lead research on topics of global importance. Mpala is open for use to researchers and students from around the world looking to understand this particular ecosystem.

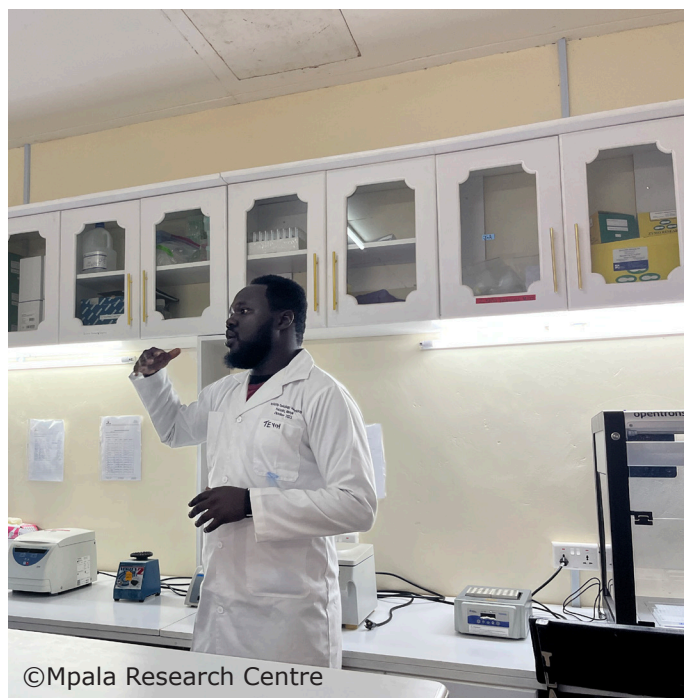
Mpala was established in November 1994 at the core of the Ewaso Ecosystem, a large, geographically diverse region of central Kenya defined by the Ewaso Ng'iro River and its tributaries. It is characterised by savannas and woodlands and is home to an estimated 550 bird species and 100 mammal species. This includes large populations of elephants and rare species like the Grevy's Zebra, reticulated giraffe, African wild dog and black rhino.

With the support of our partners, Mpala's vision is based on three pillars.

People: To assemble the world's most diverse and inclusive research community by building partnerships with leading centers of knowledge and investing in capacity building for African scientists and scholars.

Place: To utilize financial, operational, and environmental sustainability to ensure that Mpala's resources are stewarded in service to the people of Kenya, Africa, and the world.

Purpose: To advance inquiry into society's most consequential issues by enabling and disseminating research and teaching with real-world applicability.



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Laboratory Technician Tevin Onyango giving a tour of the Genomics Lab.

Partners

Mpala is jointly operated by Princeton University, the Smithsonian Institution, the Kenya Wildlife Service, the Wildlife Research and Training Institute, and the National Museums of Kenya.



PRINCETON UNIVERSITY

Princeton University serves as the managing partner for Mpala. Through the University, Mpala has been awarded several National Science Foundation grants to improve facilities and remodel the campsite. Throughout the year, Princeton faculty, researchers, and graduate and undergraduate students visit the property to expand on their knowledge of the African landscape and to undertake research.



Smithsonian

The Smithsonian Institution

is a Trust Instrumentality of the United States that administers a group of museums and research centres. Mpala is the Smithsonian Institution's first permanent research facility in Africa. The Smithsonian Institution offers multiple fellowship opportunities with Mpala to promote the study of biology, anthropology, geology, hydrology, material science, social science, soil science and related areas.



WILDLIFE RESEARCH & TRAINING INSTITUTE

Discover Beyond

The Wildlife Research and Training Institute is a Kenyan state Corporation established under the Wildlife Conservation and Management Act of 2013. WRTI is involved with development, coordination and execution of wildlife research programs and policies, as well as training and capacity development. Mpala is partnering with WRTI on implementation and dissemination of research as specified in the National Wildlife Research Agenda 2023-2027.



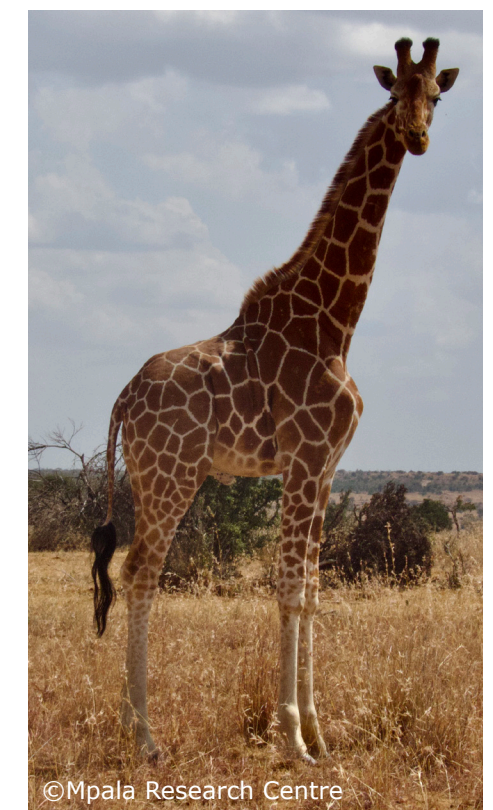
The National Museums of Kenya

is a state organisation that manages museums, museums sites and monuments in Kenya. It carries out heritage research, and has expertise in subjects ranging from paleontology, ethnography and biodiversity research to conservation. Multiple researchers at Mpala are officially affiliated with NMK and collaborate with NMK scientists, making extensive use of their facilities, materials, and expertise.



Kenya Wildlife Service

is the government agency tasked with conserving and managing wildlife in Kenya, and enforcing related laws and regulations. Mpala collaborates with the KWS in various aspects of research, such as capturing and collaring of wildlife, treatment of sick animals, and security enforcement. KWS also undertakes and coordinates biodiversity research and monitoring.



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Research Projects



©Tevin Onyango

REDINET team members checking for ticks.

The Remote Emerging Disease Intelligence—NETwork

Compiled by Maureen Kamau

The Remote Emerging Disease Intelligence-NETwork (REDI-NET) consortium aims to develop a global collaborative network of excellence among domestic and international partner institutions to address surveillance needs to effectively detect, predict and contain potentially emergent zoonosis (diseases that can spread between animals and humans) of human importance and improve the accuracy and timeliness of the 'data-to decision' pipeline. The gold reach-back support labs (University of Notre Dame, Naval Medical Research Center and Walter Reed Biosystematics Unit) have developed field-ready, robust standard operating procedures for standardization of data collections, specimen storage, preparation, and processing. Silver labs conduct field work

and laboratory testing to characterize naturally occurring pathogens in temperate (Florida), tropical forest (Belize), and tropical grassland sites (Kenya).

Mpala hosts the REDI-NET silver laboratory which implements field surveillance and laboratory testing to characterize naturally occurring pathogens on tropical grasslands in Kenya. The Silver lab team includes Dr. Maureen Kamau, the team lead; Dr. Janerose Mutura, field veterinarian; Griphyn Ochieng, research technician; and Rashid Lebunge, research assistant. The gold lab at the Walter Reed Biosystematics Unit led by Dr. Yvonne Linton provides reach-back support and training for the silver lab team at Mpala.



©Tevin Onyango

REDINET team members collecting a water sample at a watering hole.

REDI-NET fieldwork activities in Kenya include monthly collection of ticks and water samples at selected permanent and high wildlife and livestock traffic watering holes across Laikipia County. The silver lab team will also collect tick samples at targeted tick sampling sites to assess the presence and absence of tick species and pathogens they carry. The REDI-NET pathogen portfolio also includes opportunistic vertebrate DNA testing of samples collected from non-consortium members whose testing outputs are aligned with REDI-NET project deliverables. The Mpala silver lab team members have received training from the gold lab at WRBU-WRAIR and are now able to conduct field collections, process a variety of sample types: environmental samples (water, soil); invertebrate samples (leeches, ticks) and vertebrate samples (swabs, blood, feces). The team can also complete nucleic acid extractions and nanopore library preparations and sequencing.

The REDI-NET project activities are

centered around addressing critical gaps that still exist to effectively mitigate emergent or re-emerging pathogens on local, national, and global scales. First, disease surveillance efforts are often narrow in scope (targeting a predetermined number of biological samples and testing for known pathogens). Second, lack of capacity at the source of sampling to identify invertebrates and process various sample types is problematic as surveillance reports can be seriously delayed while samples are sent to overloaded reach-back laboratories, where it can take weeks or months to be processed with data release occurring many months later. A lack of appropriate epidemiological surveillance tools and adequately trained staff to carry out surveillance activities also exist. Finally, a uniformed approach to data warehousing and analysis for risk assessments is also critical to improving the predictability and reliability of disease forecasting.

The standardization of data collection,

specimen preparation, storage, and processing on the REDINET project addresses limitations in training and the absence of suitable epidemiological approaches for disease surveillance. For broad-spectrum pathogen detection, a metagenomic approach—allows for the identification and characterization of organisms—will be used for pathogen detection facilitating the discovery of known, emerging and unknown pathogens. To address the specimen identification gap, the collected ticks will be identified using morphological keys and images of these ticks taken. This data will be used to develop a high throughput automated AI technology for morphological tick species identification, facilitating distance and real-time tick identification. A key deliverable of the REDI-NET is a custom designed electronically merged (e-MERGE) data pipeline and alert dashboard that integrates remotely captured data with state-of-the-art metagenomic next-generation sequencing technology. This

pipeline incorporates data generated from field and laboratory best practices, to provide health decision-makers with a centralized, timely, and rigorous database to efficiently search interdisciplinary and heterogeneous data sources necessary to alert, prepare and mitigate health threats. The e-MERGE pipeline, once fully established, will be a flexible, scalable, and expandable tool for varied health applications.

With the REDINET project permits recently issued, the silver lab team has embarked on monthly field collections, as well as processing and testing of the collected samples. Accurate prediction of zoonotic spillover events requires a detailed understanding of baseline pathogens circulating in differing global environments. By characterizing the diversity and determining the natural baseline of pathogens in Laikipia's tropical grasslands, any concerns regarding this balance can be detected, leading to estimates of risk for emerging diseases.



REDINET team from left to right: Dr Janerose Mutura, Griphin Ochieng, Rashid Lebunge and Dr. Maureen Kamau.

The Plant Adjustment Toolkit Project

Compiled by Dr. Patrick Milligan

In June 2023, our lab group completed fieldwork on a two-year-long project located in and around the Kenya Long-term Exclosure Experiment (KLEE) plots at Mpala that had focused on the physiological (how organisms function in a system) and epigenetic (how environment and behavior can affect how genes work) adjustments by ant-hosting *Vachellia drepanolobium* trees to the four native ant species that nest in the tree grove canopy. We were investigating how a host tree adjusts various photosynthetic processes after takeover by a new ant species. Because the four ant species found in black cotton savannas have very distinct costs and benefits for their host tree, this is an excellent system to study how plants in general might respond to changes in insect mutualist services through physiological adjustments. Nearly every terrestrial plant receives some kind of "service" from insects, and those services can include pollination of flowers, dispersal of seeds, or even protection from animals that would eat the plant.



Ants on an Acacia tree.

We have also been investigating if these physiological adjustments are

governed by changes in DNA methylation patterns, one of the mechanisms by which organisms can modify how they express genes. This "plant adjustment toolkit" of epigenetic and physiological adjustments may help explain how plants can remain flexible in a landscape with many potential and different partners, while also maximizing their benefits when paired with any specific insect partner.

We conducted this project inside of KLEE and in the surrounding tree groves, leveraging the long-standing exclusion fences, so that we could study plant adjustments under high-herbivory and no-herbivory conditions. In the outer perimeter of KLEE and in *V. drepanolobium* groves outside of KLEE, we surveyed leaf physiology of similarly sized host trees and collected leaf tissue for epigenetic analysis. Equal proportions of trees at each site were occupied by one of the four native ant species, and after our initial surveys in 2021, we then engineered takeovers by a new ant colony onto each tree. We then re-surveyed the trees 14 months later, at which point many host trees displayed remarkable physiological adjustments to their new ant colony. Dr. Milligan is now working on the epigenetic analysis of leaf tissues from this project.

This project contributes a physiological perspective to the larger KLEE effort, creating a longitudinal (tracks the same type of information on the same subjects at multiple points in time) and spatially explicit (specifies location) dataset that can be used to predict how long-term trends in ant community composition within KLEE are driving changes in tree carbon fixation, carbon

storage, and water use efficiency. Black cotton savannas across East Africa will experience changes in rainfall totals and frequency, herbivore pressure, and insect abundance and diversity as human development changes the landscape. Our project helps us to understand how these changes will affect fundamental plant carbon and water cycles. We hope to expand this project in the future to ask more questions about plant adjustment mechanisms that may be applicable to a broad range of insect-plant mutualisms.

The Plant Adjustment Toolkit Project team includes Dr. Patrick Milligan, John Mosiany, John Lemboi, Dr. Elizabeth Pringle and Dr. Todd Palmer.



©Dr. Patrick Milligan
Dr. Milligan doing a photosynthesis survey.

The Buffelgrass Project

Compiled by Aimee Gaitho

After habitat alteration, invasive species are considered to be the second-leading factor contributing to the loss of biodiversity worldwide. The Buffelgrass Project provides the scientific basis for biological control and integrative management of introduced grass species in regions where they have become invasive. The team studies Buffelgrass in its native range (Kenya) to better understand what makes it so successful

when introduced into foreign rangelands.

This study provides scientific training to Kenyan researchers based at Mpala Research Centre. The Kenyan team at Mpala consists of Lab Coordinator Aimee Gaitho and Research Technicians Godfrey Gitimu, George Koech, and Godfrey Amoni.

The establishment of buffelgrass in regions like Australia and Arizona has resulted in a transformation of fire regimes, leading to the domination of invasive species in native desert communities and a consequent reduction in the cultural and ecological value of these regions. The presence of invasive grasses can have unintended environmental implications, such as an increase in the frequency of fires due to the accumulation of dense and flammable biomass.

The introduced buffelgrass populations generate a substantial amount of leaf litter, but the lack of native detritivores, a type of insect adapted to feeding on and



©Mpala Research Centre
Buffelgrass at Mpala.



Research technicians George and Godfrey counting Buffelgrass.

decomposing this litter from introduced grasses, is a challenge. Therefore, it has been suggested that arthropod detritivores from the native range could serve as potential biological control agents for the aging and dead biomass of invasive grasses, provided they meet the necessary requirements of host specificity.

This study showcases how our long-term buffelgrass exclosure project provides data that is broadly relevant to our knowledge of grass-insect interactions and community ecology. The specific purpose of the long-term exclosures is to test how buffelgrass responds when released from ecological stressors such as wildlife, insects, fungi, and plant competition to understand more about buffelgrass, which is a very important pasture resource in Africa but has become aggressively invasive when it has been introduced overseas. Buffelgrass has been implicated in devastating fires in Hawaii and elsewhere, and has disrupted the biodiversity and ecosystems where it has become invasive.

This study elevates the project's capacity to document the interactions between plants, herbivores, and their natural enemies that revolve around grass host plants on a global scale. The team currently uses lessons learned throughout this project to document grass-insect associates of over 75 grass species across Kenya (Mpala Research Centre and Arabuko-Sokoke), South Africa, and Texas, USA.

"Understanding the ecological factors that keep buffelgrass in check at home allows us to develop targeted biocontrol methods to combat its devastating impacts on ecosystems abroad," shared Lab Coordinator Aimee Gaitho.

So far, the project has produced XX publications, sharing findings. Dr. Dino Martins is the primary Kenyan contributor. The project works in association with Nature Kenya, and receives funding from the Lee and Ramona Bass foundation through the University of Texas, Austin.



Uhifadhi Wa Chui - Leopard Conservation Program

©San Diego Zoo Wildlife Alliance

Compiled by Dr. Nicholas Pilfold and Laiyon Lenguya

African leopards are one of the world's most iconic wildlife species. Mysterious and elusive, African leopards are a bucket-list highlight for many on safari, while at the same time, a nuisance animal to many local people that live alongside them. Leopards are stealthy, and this makes them difficult to track and therefore a joy to see on safari. But their stealthy nature as predators also includes slipping into livestock bomas (enclosures) at night undetected to kill goats and sheep. In the local communities that surround Mpala, leopards have often been the principal species of blame when livestock are killed or injured by an unseen predator. This in turn leads to conflict between humans and leopards, and at times, retaliatory killings. Leopards face a number

of conservation threats across their range, including habitat loss, reduced prey, and wildlife trafficking. But it has become apparent that retaliatory killings, which occur for real or perceived loss of livestock, is the top threat leopards face and may even exacerbate other conservation issues like illegal trade. Additionally, the elusive nature of leopards makes them a difficult study species for scientists, and as such, limited information on their population status exists within Kenya. Due to this deficit of information, conservation management plans are yet to be created for leopards, leaving them decades behind their large carnivore counterparts.

Uhifadhi Wa Chui

In 2017-2018, the San Diego Zoo Wildlife Alliance

(SDZWA) began studying African leopards on Mpala and other nearby conservancies, as well as on communal lands. We called the program Uhifadhi Wa Chui, which means Conservation of Leopards in Kiswahili. While the need for a long-term monitoring program to inform conservation management was apparent, the task of where to begin was not as easy.

We split Uhifadhi Wa Chui into two core objectives: population status and community coexistence. These objectives required differing approaches. The population status work is led by Dr. Nicholas Pilfold, a biologist with formal training in the population ecology of large carnivores. The community coexistence work is led by Drs. Kirstie Ruppert and Tomas Pickering, social

scientists who specialize in understanding human dimensions. Our Kenyan team is made up of early career researchers. Ambrose Letoluai leads the community coexistence work on the ground, and Laiyon Lenguya leads the population status. These two rising stars are the key to a sustained effort in conserving leopards in Kenya.

Population Status

Beginning in 2018, we established a grid of remote trail cameras focused on tracking leopards in private conservancies. The grid covers 420 km² including Mpala, with more than 60 camera sites. Our first activity was to gather high quality observations of leopards so that we could identify individuals through their coat patterns and track their survival outcomes.

As limited information on leopards in the area existed, we reached out to rangers and staff of the conservancies to gather information on where leopards had previously been sighted. The one advantage to studying a charismatic but secretive big cat, is that many can remember the exact place they saw leopards, even if years in the past. This is where we started when selecting camera sites. We looked for specific clues

to identify a site that was actively used by leopards, which led us to focus on Boscia trees. With their soft bark, Boscia trees retain the claw marks leopards leave when climbing in for a rest, to hoist a recent kill or to mark their territory. In November 2023, graduate student Beatrice Chataigner completed her master's degree at the University of Montpellier, and her thesis work showed that positioning cameras near trees significantly increased the detection of leopards.



Leopard Claw Marks on a Boscia Tree.

In addition, we trialed using perfumes at the trees to increase the visitation rate at the cameras. Results from our analysis show a significant increase in visitation rates with the application of perfume and higher quality images for coat recognition as leopards will stay in frame longer and slow their movement, which is particularly important at night when images can blur.



We have now collected more than five years of leopard observations, and we are currently analysing the images to calculate the density of leopards living in the area, and how the density may have changed over time. This will lead to the first empirical population status assessment for leopards anywhere in Kenya, though over a small area relative to the scale of the country.

Our next steps are to scale up our population assessments. Over the past 18 months, we have grown our collaborators in the region so that we may start rapid assessments across two major corridors: Lewa Wildlife Conservancy to Mugie Conservancy (East to West) and Ol Pejeta Conservancy to Mugie Conservancy (South to North). We plan to use a combination of genetics and camera trapping to conduct rapid population assessments to infer the

number of individuals living in the region, and their relatedness.

To utilize genetics in our research, we need first to have an African leopard genome sequenced with sufficient depth in order to call specific markers for individual recognition from DNA samples left in the environment, such as hair and feces. We are currently establishing the genetics work at the sequencing labs at Mpala, led by Dr. Mrinalini Erkenwick Watsa. We are hopeful that with all permissions in place, we will complete this important step in 2024.



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Community Coexistence

Uhifadhi Wa Chui began with a request from the communities to SDZWA to establish a program local to Mpala that could help manage the conflict between leopards and livestock. Beginning in 2017, we started with household interviews to establish a baseline of community attitudes

and perception of risk to livestock predation. It was clear from these interviews that there was not much love for leopards.

From 2018-2021, we utilized multiple approaches within communities to try to understand and mitigate conflict with leopards. We hired a community reporting network of 20 individuals working in their local enclaves to document conflict. We outfitted each with a cell phone and survey software to record the data whenever livestock were injured or killed, regardless of the predator. The strategy worked marvelously: we accumulated detailed information including photographs for thousands of conflict events. The data revealed patterns not entirely unsurprising, leopards and hyenas were equally responsible for approximately 90% of the livestock attacks and these attacks varied seasonally and spatially.

We also deployed cameras at livestock bomas within the communities, to understand nighttime attacks more closely. The communities were made aware of the benefits of the research through community meetings, and as a result, the camera systems were well-cared for and damaged less frequently than the cameras inside private

conservancies. The results of the study showed that although leopards and hyenas are equal in their predation of communal livestock, their visitation is completely opposite. Hyenas are opportunistic loiterers, often hanging around looking for an easy meal but rarely attacking, while leopards are dedicated hunters, visiting bomas less frequently, but often attacking when present. We are now using the camera data combined with fine-scale data from weather stations erected in the communities to determine how local environmental conditions in the hours before a conflict event may predict the type and directionality of attacks at the bomas.

In combination with the observations of conflict documented by the reporting network and by camera, we trialed predation deterrence devices at 120 bomas. The deterrence was split between wire mesh reinforcements of the inner boma and passive solar lights that charge during the day and blink at night placed around the outer perimeter. Both deterrence strategies significantly reduced conflict at the bomas. In the most promising outcome, the community of Lekiji, close neighbors to Mpala, reported an extended period of no nighttime attacks after the deterrents



Installing a light at the boma.
©San Diego Zoo Wildlife Alliance

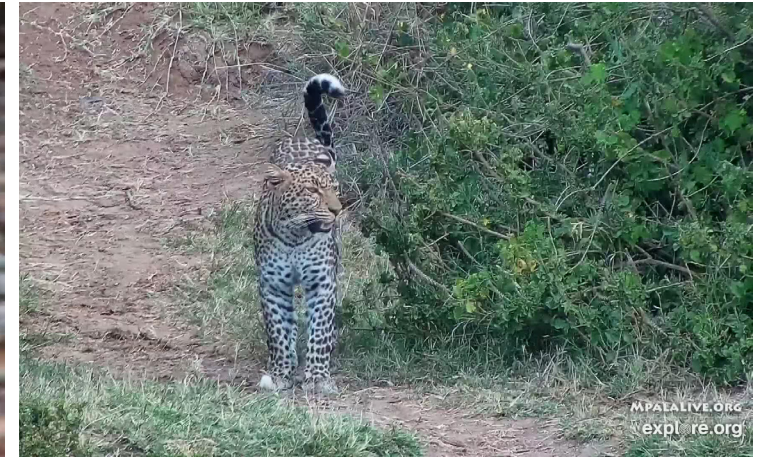
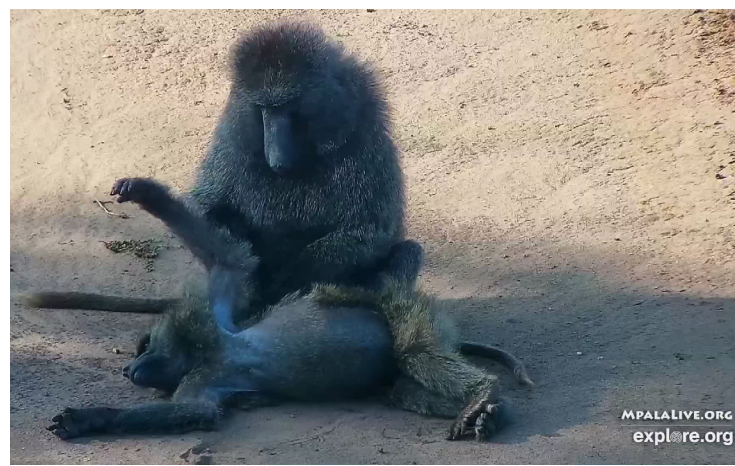
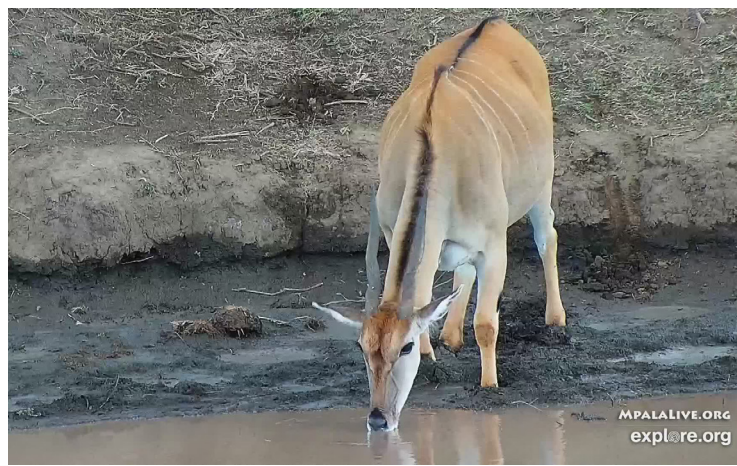
were installed. People reported sleeping better at night, as they felt relief from needing to constantly monitor their livestock. While we continue to sift through the rich community data and infer management actions that can help to mitigate livestock loss, we have moved forward with other activities on the ground. In 2022, we broke ground on the Chui Mamas Centre, a community centre focused on women's health and economic prosperity. The Chui Mamas (Leopard Mothers) formed in 2019, with Ambrose Letoluai as one of the founding directors. SDZWA supported the construction of the Centre, as it helps us achieve another program objective: creating a supply chain for livestock deterrents directly to community

members for purchase. Our goal is to create a market for deterrents that is self-sufficient. The Chui Mamas Centre will be fully completed and begin selling wares in 2024. The next major activity to help mitigate conflict is to deploy GPS collars on leopards that are likely to travel within communal lands. Given that leopards

attackers of livestock, it is important to have a finer understanding of their proclivities. The collars will also allow us to understand another type of conflict that we need further information on: when livestock are away from the boma during the day. We plan to begin the deployment of 20 collars in 2024.



©San Diego Zoo Wildlife Alliance



MpalaLive!

Compiled by Valerie May, PI and Executive Producer, MpalaLive!

MpalaLive! is a digital educational outreach program that features live streaming webcams, an interactive field guide, downloadable lesson plans and activities, and videos highlighting both the people and animals of our region, as well as the research conducted at Mpala Research Centre. Our mission is to share the wonders and challenges of our landscape, inspiring a new generation of conservation biologists. This year marks our tenth anniversary, and we owe our success to our sponsor and partner, Explore.org, through which we have reached a vast global audience. In 2023 alone, the live streams generated an impressive 74 million views. We are supported by the Annenberg Foundation and its offshoot Explore.org.

A significant achievement last year was moving the camera installation to a safe location. The cameras are situated on a

bend of the Ewaso Ng'iro river overlooking the hippo pool. In 2018, torrential rains caused the river to jump its banks. Heroic efforts by Mpala staff salvaged the broadcast equipment and it was relocated to a safer location. Climate change continues to affect the course of the river and in 2023, team leader Victor Kasii led the effort to relocate the camera once again.

The effort required a taller mast as well as relocation of the cams. The project was completed on October 30, one day before the rains began. The subsequent changes in the water flow would have toppled the old rig.

Website Development

Last year saw significant additions to the website. Twenty-seven birds were added to the online Field Guide, including the Goliath Heron and the African harrier hawk. There are now 133 entries. Stories from the Bush saw the expansion of the Reading Corner, a Northern Kenya Conservation Club project utilizing multimedia features to engage children with active storytelling. There are

currently nine videos with approximately 17,000 views and 800 hours of watch time.

Live Cam Highlights

One of the most amazing wildlife events to ever unfold in front of our cameras was the successful birth of a baby hippo in February 2023 (see top right picture). Typically, hippos give birth in the water, but due to the severe drought at that time, the mother emerged from the water to deliver on the dry riverbed, fully visible to our cameras. It may be the only successful wild birth on land ever recorded. Viewers participated in a contest to name the newborn; "Amani" was the winner.

In another extraordinary event, a buffalo was stuck in the mud during that same period of drought. Because it happened in front of the cameras, Mpala rangers were alerted. The animal was successfully rescued with no injuries to staff (see bottom left picture). After resting, the buffalo wandered off that night into the bush—also recorded on the cams, which

are equipped with night vision.

Live camera operators, Everlyne Ndinda, Anne Mukoma, and Fred Kiboko are responsible for capturing events like Amani's birth and the buffalo rescue. They have been with the project since its launch 10 years ago. Fred is now also our technical lead, assisted by Damien Irura.



©Victor Kasii, MpalaLive!

MpalaLive technical lead Fred Kiboko poised on the mast getting our equipment in place.

Community Outreach



© Samburu-Laikipia Wild Dog Project



© Samburu Laikipia Wild Dog Project



©Mpala Research Centre

The Laikipia Rabies Vaccination Campaign

Since 2015, the Samburu Laikipia Wild Dog Project has spearheaded the annual Laikipia Rabies Vaccination Campaign (LRVC), which vaccinates domestic dogs and cats against rabies and canine distemper.

Around 2,000 people lose their lives to rabies annually in Kenya, with the

majority of these deaths being children residing in rural areas. Vaccinating domestic dogs is the cheapest way to control rabies, costing approximately \$2 to vaccinate a dog in rural Laikipia and approximately \$80 to treat a person bitten by an unvaccinated dog.

Vaccinations also protect the owners

and other humans interacting with that dog, livestock in that locality, and wild carnivores, particularly the endangered African Wild Dog, which can contract rabies from domestic dogs.

LRVC is a volunteer-driven initiative and is currently carried out by the Samburu-

Laikipia Wild Dog Project Researchers at Mpala and Veterinarians from the County Government of Laikipia and other conservancy partners in Laikipia such as One Health Kenya, Worldwide Veterinary Service, and many others. In 2023's main campaign, the team vaccinated 11,655 dogs and cats against rabies.

Run For Daraja

On 20th May, 2023, 10 Mpala staff joined the Race for Daraja campaign in support of girls education. This event is a 15km charity race benefiting Daraja Academy in Kenya. This virtual race takes place throughout the month of May; participants can run, walk, cycle, or swim from anywhere in the world.

Located 25 km from Nanyuki town, Daraja Academy started in 2009 as a school for exceptional Kenyan girls who had no other means of continuing their education. Daraja provides a platform where these girls can transform and

change their narratives from poverty to independence.

Mpala has partnered with Daraja since the school's founding and for many years, Mpala hosted Daraja students during their transition program, a 4-month life-skills and entrepreneurial training program, where they were attached to different departments of their interest.

Every year, we host form 3 students for a day visit where we organize talks by Mpala researchers, a tour of the labs, field activities, and mentorship.



©Daraja Academy

Community Outreach Officer Fardosa Hassan (Left) participating in the race with Mpala and Daraja staff.



©Mpala Research Centre
Community Outreach Officer Fardosa Hassan drinking water from the borehole.

Water Access

For many years, Mpala has been supporting our neighboring communities with water using our water tank truck. Water access has been a challenge for the local communities, and our support has been key, especially to the schools and the health clinics. In 2023, we made 40 trips to the local communities.

This year, Mpala funded the drilling of a borehole in Lekiji, a neighboring community to Mpala. This initiative aims to provide sustainable access to clean water for the community. This borehole is

strategically placed near the school and clinic to support the students, teachers, and the overall community. Access to clean water will have a significant impact on health and education for this community.

Prior to the borehole, Lekiji residents would collect their water from the nearby river. We are working on plans to sustainably support more of our neighboring communities in terms of water access.



©Fardosa Hassan
Lekiji Borehole Committee.

Community Visits

We continue to encourage students and researchers visiting Mpala to also visit the local communities to interact and learn about their cultures. During these visits, students get to learn about conservation efforts by the local communities, how they coexist with wildlife, and engage in different cultural activities. Some of the groups that visited in 2023 include:

1. University of Glasgow
2. Swedish School
3. Princeton University
4. University of Helsinki
5. St. Lawrence University
6. American University
7. University of Colorado

School Exposure Trips

This initiative targets the local schools by supporting students to visit Mpala and learn more about the science that is going on here as well as inspire them to pursue science in the future. In 2023, we hosted students from five schools, Lekiji Primary, Ol Jogi Primary, Naibor Secondary, Ewaso Secondary, Kimanjo Secondary who interacted with different research projects, including Isotopes, Superb Starling, Guinea fowl at Mpala and took part in activities like game drives and interactive games.

Additionally, the students got to tour our labs and work with various lab instruments. Our goal is to expand the number of nearby schools, particularly those without a lab, so they can learn more about lab work done at Mpala.



©Mpala Research Centre

Daraja Academy class visit to Mpala. The students are looking at the Hippo Pool.

The George Small Scholarship Fund



2023 GSF students at Mpala.

Administered by Mpala, the George Small Foundation provides annual scholarships to disadvantaged students through the George Small Fund. Each year, three successful students are supported through high school while two others receive support for a vocational course at a technical college. The scholarships target students from our nearby communities: Lekiji, Ilmotiok, and Naibor as well as children of Mpala staff. The GSF program has supported 36 high school students and 17 students in technical college in the past 10 years.

In April 2023, Mpala hosted 17 current GSF scholarship recipients. The students engaged in activities that addressed their experiences in school, academic success, and how the scholarship has impacted their lives. These students interacted with some of our scientists to learn more about the research that occurs at Mpala. The students also went on a game drive

where they had a lesson on wildlife identification.

This year we increased our efforts to mentor these students and regularly follow up on their academic journey.

One of these students is Marion Tenai. Marion is from Naibor and recently graduated from Loise High School, where she received an impressive score on the Kenya Certificate Secondary Education (KCSE), the final exam for high school that impacts where you can go to university. The top grade in the KCSE is an 'A' and Marion managed a very impressive A minus, making her a top student in Kenya. Marion defied all odds and she navigated the challenges of limited access to education, rising above societal expectations and financial constraints.

"The scholarship has really helped me," Marion shared. "It was not a guarantee

that I would join high school let alone finish it." Since the GSF scholarship funds all school-based costs—tuition, room and board, school supplies and uniforms, as well as personal supplies—Marion was able to thrive.

Marion's success is a testament to what can be achieved when you invest in education. "I hope to join a university, and do a course in programming or electrical engineering. Then afterwards, get a good job and stabilise myself," she said.



Marion Tenai in front of the admin building at Mpala.

Community Committee Formation

In the past years, we worked very closely with our two immediate neighboring communities, Il Motiok, and Lekiji but in 2023 we extended our coverage to two more of the local communities, Koiya and Tiamamut.

We value our relationship with our neighboring local communities and continue to increase our collaboration and impact.

This year we took the initiative of creating a Mpala community committee that will be key for our community engagement efforts. This committee is composed of leaders from our four partner communities, women, and youth representation.

School Feeding Program

2023 was a challenging year for the local communities in Laikipia due to the prolonged drought. The drought highly affected the local schools in terms of providing meals to the students as well as water scarcity.

During the year, we did a feeding program for two of our immediate local schools, Il Motiok and Lekiji, and were able to feed at least 700 kids for three months as well as provide meals for candidates who were sitting for their final examination at the end of the year.



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Samuel Kiuna and Chrispin Odhiambo at Baculi, a viewpoint at Mpala.

Mpala Graduate Student Scholarship

The Mpala Graduate Student Scholarship Program is a transformative initiative that empowers African students to pursue higher education and conduct cutting-edge research at Mpala. Our scholarship program is built on a foundation of educational empowerment, research innovation, and conservation stewardship.

Scholarship Overview

Starting in 2023, Mpala has provided full scholarships to two recent outstanding university graduates in Kenya. These scholarships cover tuition, stipends, room and board at Mpala, and fieldwork costs, providing students with the resources they need to excel in their academic and research endeavors.

Selection Process

The selection process is rigorous and designed to identify the most promising scholars from Kenya:

- Mpala solicits nominations from faculty members at Kenyan universities.
- Nominees attended a weeklong symposium at Mpala which includes workshops on research project design, how to apply for scholarships, CV writing and interview preparation.
- Nominees are invited to submit written applications and attend oral interviews.

Keep reading to learn more about the current scholarship recipients.



©Lucrecia Aguilar

Samuel Kiuna grew up in Nyahururu, Kenya. He completed his undergraduate studies at Karatina University where he studied Natural Resource Management with a focus on Wildlife Management. Through the Mpala scholarship he has just begun his MSc at Karatina University. His proposed research project is entitled, "Optimizing rangeland restoration through movable cattle corrals." Sam's study will look at how livestock management practices can maximize rangeland productivity, biodiversity, and wildlife conservation.

"I am deeply grateful for this scholarship. It is not just a financial award; it's a token of opportunity, personal growth, and a hope for a more promising future, especially by being at Mpala, because Mpala offers a great opportunity to meet and interact with researchers from all over the world. It provides a space to receive mentorship, and an opportunity to engage in collaborative research. It is my responsibility to use this opportunity to its fullest, both for my benefit and the betterment of the world around me."

~ Sam Kiuna



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Chrispin Odhiambo grew up in Homa Bay, Kenya. He completed his undergraduate degree at Jomo Kenyatta University of Agriculture and Technology in Environmental Science and has begun his MSc at the same university. His proposed research project is titled, "Understanding the influence of precipitation patterns on vegetation cover at Mpala Research Centre, Kenya." Chrispin's project will provide critical insights into how climate change affects vegetation dynamics, ultimately contributing to our understanding of ecosystem resilience.

"Receiving the Mpala Graduate Student Scholarship means more to me than words can express. It signifies an incredible opportunity for personal and academic growth. This scholarship will enable me to pursue my passion for wildlife conservation and ecology without the financial constraints that often hinder such pursuits. It means the chance to engage in impactful research, gain hands-on experience, and contribute to the broader mission of conserving our planet's biodiversity. It is not just financial support; it's a life-changing opportunity to make a real difference in the world of conservation."

~ Chrispin Odhiambo

Impact

Through the Mpala Graduate School Scholarship, we aim to grow the network of African researchers crucial for addressing the global challenges of our time. Africa holds immense potential to enhance the world's scientific knowledge, through the Mpala Graduate Student Scholarship, we are not just investing in individuals; we are unlocking the potential to shape a positive impact on our collective future. We are pleased to share that during the 2023-2024 fundraising campaign, we raised \$72,000, enabling us to support two more Kenyan students.

Workshops and Conferences



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Dr. Winnie Kiiru engaging with the Governor H.E Joshua Irungu of Laikipia

Laikipia Conservancies Association Meeting

The Laikipia Conservancy Association (LCA) held their second meeting on 25 August, 2023 at Mpala Research Centre. Dr. Winnie Kiiru, our Executive Director, welcomed the Governor H.E Joshua Irungu, who led the meeting and was accompanied by Ms. Leah Njeri, County Executive Committee Member for Water, Environment and Natural resources and Mr Kenneth Irumbi Kibara, Chief Officer of Lands, Housing, Urban Development & Energy. The meeting delved into the proposed County Finance Bill, Valuation Roll, County Spatial Plan, Legislation & Policy Framework, and Security. Mpala was happy to host this collaborative meeting, which is critical to the achievement of our shared goals on conservation.



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Mpala's researchers, Research Liaison and communications team at the WRTI conference.

Wildlife Scientific Conference

Mpala attended the 1st Wildlife Scientific Conference organized by the Wildlife Research & Training Institute in Naivasha, Kenya from the 26 to 28, September 2023. The theme, "Use of Wildlife Science for Enhanced Biodiversity Conservation and Improved Livelihoods," brought together scientists from around the world to share knowledge and experiences.

Our researchers highlighted work on Plains and Grevy's Zebras, giraffes, leopards and baboons, tree dynamics, the effectiveness of bomas with wire-fencing and lights, livestock, and the Eastern Black Rhinoceros. The communications team also set up a booth to showcase Mpala's work.

Laikipia Journalism Workshop on Community Conservation

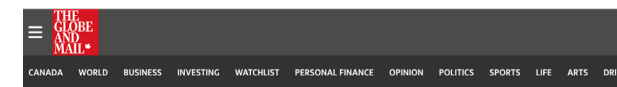
Organized by the Internews Earth Journalism Network (EJN), we hosted the Laikipia Journalism Workshop from 31 July to 4 August, 2023, after being postponed due to the COVID-19 pandemic. Journalists from East Africa, representing Kenya, Uganda, Tanzania, and Rwanda participated while speakers came from organizations like the Kenya Wildlife Conservancies Association, Northern Rangelands Trust, and the Laikipia Conservancies Association. The discussions covered impactful photography techniques, maximizing the potential of emerging digital media platforms, and collaborative brainstorming to refine story pitches. As part of the program, participants visited the Il Ngwesi Community Conservancy, celebrated as a success story in this conservation model. The workshop's successful conclusion represents a significant milestone for the East Africa Wildlife Journalism project, supported by USAID and the U.S. Department of Interior.



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Kimani Ndung'u explaining the different types of acacia species growing within Laikipia to the journalists.

Mpala in the News



Elephant ivory and rhino horn imports banned by Ottawa

MARIE WOOLF >
OTTAWA
PUBLISHED NOVEMBER 20, 2023

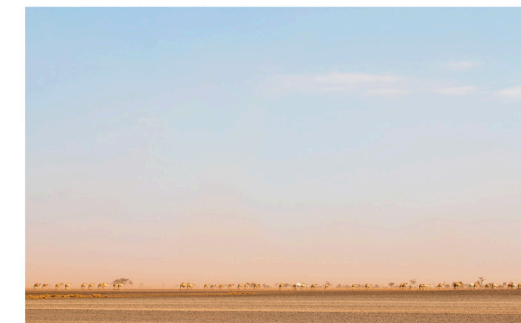


Items made of ivory and a rhino horn, front left, part of the collection of confiscated items held by Environment and Climate Change Canada, on display during a news conference on the implementation of stricter measures to regulate the trade of certain wildlife items, particularly elephant ivory and rhinoceros horn, in Ottawa on Nov. 20.

Smithsonian's National Zoo and Conservation Biology Institute and Kenyan Partners Awarded \$5 Million Grant To Prevent Emerging Diseases in Northern Kenya

Five-Year Study of Three Animal-Borne Pathogens Aims to Enhance Local and Global Health Security

Jun. 06, 2023



SCIENCE & TECHNOLOGY

It Takes a Flock: What Songbirds Can Teach Us about Strong Bonds

Columbia scientists shed new light on how superb starling communities survive and thrive.

FALL 2023



OUR WORK TAKE ACTION SUPPORT BORN FREE

BORN FREE BRINGS TOGETHER EXPERT PANEL TO LOOK 'BEYOND ZOOS'

1/12/2023

CAPTIVITY/ EVENTS/ NEWS/ POLICY/ ZOOS & AQUARIA

Home > News & Updates > Born Free brings together expert panel to look 'Beyond Zoos'

On Wednesday 29 November, Born Free hosted an inspiring evening of discussion exploring the moral, ethical, conservation, educational and economic questions posed by the keeping of animals in captivity, and what a future 'beyond zoos' could look like.



Rangers—the unsung heroes of wildlife conservation

Monday, August 28, 2023



Mpala ranch shaping community conservancy through research

Environment News August 9, 2023



Featured Publications



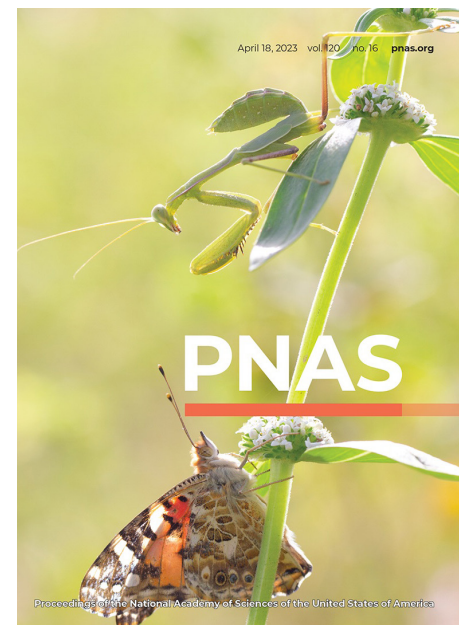
©Global Change Biology published by John Wiley & Sons Ltd.

Pictured is a mother African wild dog and her pups in Laikipia, Kenya. Climate change may push species beyond their ability to cope with extreme climates, and reduce the group sizes in cooperatively breeding species to a point where populations are no longer viable. Using a single-sex individual-based model incorporating demographic responses to ambient temperature in an endangered species, the African wild dog (*Lycaon pictus*), the authors show that there is a threshold temperature above which populations of the species are predicted to collapse. Photograph by Helen O'Neill. For more information, see Rabaiotti et al (2023) <https://doi.org/10.1111/gcb.16890>



©Journal of Animal Ecology published by John Wiley & Sons Ltd on behalf of British Ecological Society.

Pictured is a band of gelada monkeys at the Guassa Community Conservation Area in the Ethiopian highlands. This research demonstrates a general method for using consumer drones and computer vision techniques to quantify the movement and behavior of many individuals and the landscape they behave in at sub-meter spatial and sub-second temporal resolution. We demonstrate this method both with a band of gelada monkeys recorded as part of the Guassa Gelada Research Project and with a herd of Grevy's zebra recorded at the Mpala Research Centre in Kenya. Photograph by Jeff Kerby. For more information, see Koger et al (2023) <https://doi.org/10.1111/1365-2656.13904>



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Pictured is a Painted Lady butterfly (*Vanessa cardui*) facing a mantis. This research combined predictive modeling with field surveys and long-term monitoring in six sub-Saharan African countries to explore population dynamics of *V. cardui*. The authors identified extensive winter breeding grounds in tropical Africa occupied by *V. cardui* following greening caused by the rainy season. The results extend the known annual migration route of *V. cardui* up to 15,000 kilometers and could inform conservation management. Photograph by Roger Vila. For more information, see Talavera et al. (2023) <https://doi.org/10.1073/pnas.2218280120>

Publications List 2023

Mpala's researchers were featured in top journals like the African Journal of Ecology, Frontiers in Ecology and Evolution, Global Change Biology, Journal of Animal Ecology, Plant Ecology, Mammal Review, Ecology Letters, and the Journal of Ecology. Africans were first author on five papers and were coauthor on 19.

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Collaborators

