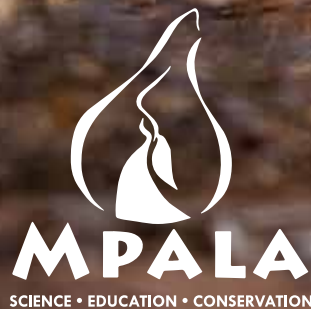


Science & Outreach 2022





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About the Mpala Research Centre

Mpala's mission is to catalyze and disseminate interdisciplinary and high impact research on the most relevant environmental sustainability and human development issues of our time. In conjunction with this mission, Mpala works to advance the understanding and conservation of natural and human-occupied ecosystems. This is accomplished through research, education, outreach, and developing solutions to guide conservation actions for the benefit of both nature and human beings.

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. The region is part of the 80 percent of Kenya's land that is arid and semi-arid. 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. The region is unique in that little of it is formally protected, yet wildlife abundance rivals the renowned Maasai Mara and Serengeti ecosystems.

The Mpala campus is located on the Laikipia Plateau and covers 48,000 acres. The land provides a hub for experimental and manipulative research open to scientists and students from all over the world. It provides a 'living laboratory' where scientists can test hypotheses in the natural environment and conduct landscape-level controlled experiments to explore curiosity-driven questions, address real-world problems, and ensure that sustainable livelihoods and economic advancement are synonymous with wildlife conservation. Mpala is open for use to researchers and students from around the world looking to understand this particular ecosystem. It has a particular mandate to build capacity among Kenyan and African scientists.

Key Areas of Focus

- Operate an enduring facility for research and education that has a primary focus on environmental, biological, and conservation sciences. This historic strength has recently been complemented by the presence of social scientists, engineers, humanists, and artists who strengthen Mpala's ability to achieve its mission.
- Sustain a long-term environmental monitoring program to measure changes in climate, land use, vegetation, livestock, and wildlife numbers; enable the understanding of biotic processes at the landscape level; and identify mechanisms for maintaining the integrity of the expansive savanna ecosystem.
- Develop an informed approach to conserving the natural resources of the greater Ewaso ecosystem and provide a leadership example for other 'non-protected' areas of Kenya.
- Promote human, livestock, and wildlife co-existence in the greater Ewaso ecosystem and provide information to help resolve conflicts.
- Provide educational opportunities through experiential learning in research and monitoring skills for students and professionals from Kenya and around the world.

© Duncan Kimuyu



Partners

The Mpala Research Centre is a partnership of the Mpala Wildlife Foundation, Princeton University, Smithsonian Institution, Kenya Wildlife Service, and National Museums of



The **Mpala Wildlife Foundation**, founded in 1989 by George Small and managed by Princeton University, supports community outreach, physical infrastructure, and land stewardship at the Mpala campus.



Princeton University is a vibrant community of scholarship and learning that stands in the service of humanity. Princeton serves as the managing partner of the research centre and works closely with Mpala senior management on governance, strategic planning, fundraising, and operations at Mpala. Through Princeton, Mpala has been awarded several grants to facilitate science and improve facilities, including a cutting-edge genomics and stable isotope laboratory. Throughout the year, Princeton faculty members, researchers, graduate and undergraduate students visit the facility to undertake research and expand their knowledge of the savannah landscape.



The **Smithsonian Institution**, an agency of the United States government, administers several museums and research centres. Mpala is its first permanent research facility in Africa. The Smithsonian offers multiple fellowship opportunities with Mpala to promote the study of biology, anthropology, geology, hydrology, material science, social science, soil science, and related areas. The Smithsonian also collaborates with Mpala on long-term research on and monitoring of the greater Ewaso ecosystem.



The **Kenya Wildlife Service** is the government agency tasked to protect and manage the fauna, flora, and ecosystems of Kenya. KWS undertakes and coordinates biodiversity research and monitoring. Mpala collaborates with the KWS on wildlife health, security, and research administration. More recently, the Smithsonian-Mpala Veterinary Fellow has been working with KWS veterinarians to treat injured and sick wildlife on Mpala and surrounding conservancies.



The **National Museums of Kenya** is a state organization that manages museums, sites, and monuments in Kenya. The NMK carries out heritage research and has expertise in subjects ranging from paleontology, ethnography, biodiversity research and conservation. A number of Mpala's researchers are affiliated with NMK and collaborate with NMK scientists, and use their facilities, equipment, and expertise.



Highlights from some of the Research Projects at Mpala



© Tobbit Dehnen

The Vulturine Guineafowl Project

Website: <https://sites.google.com/site/drfarine/the-vgf-project?authuser=0>

Compiled by **Brendah Nyaguthii**

The Vulturine Guineafowl (VGF) project has been ongoing at Mpala for over six years now. We have hosted several postdocs,

Ph.D. and MSc students on the project. We have also offered internship opportunities to local Kenyan students who have been able to gain knowledge on bird behavior and bird-handling skills, among others.

Over the entire study period, the vulturine guineafowl project has trapped 1,450 individuals and fitted the adults with unique color bands on their tibiotarsus and the juveniles with numbered chick tags. This process allows us to identify each and every bird individually. Some of the birds are also fitted with GPS tags,



Photos: © Tobit Dehnen

The VGF team and principal scientist, Mountain Conservation Area.

which enables us to track and monitor our groups across the landscape over the years. In 2022 we had the honor of hosting the KWS principal scientist at mountain conservation area, Geoffrey Bundotich, to inspect our trapping processes and procedures.

Over the last two years, we have had a really great challenge due to the recurring drought conditions ongoing at Mpala. The birds have not bred since December 2020, and the numbers are declining. The birds have also been observed to move very far away from their normal range in search of food resources. We hope to have more rain in the coming months so that the birds can breed and maintain a good population size.

Despite these challenges, the scientific output from VGF has grown tremendously. This year alone, we published three peer-reviewed articles, bringing the total number of publications from this project to nine. Our project has also been featured in documentaries such as “ANIMAL DEMOCRACIES,” “ANIMAL

SOCIAL NETWORKS,” and “WILDLIFE WARRIORS,” among others.

The VGF team is led by Prof. Dr. Damien Farine of the University of Zurich and Australian National University. Currently, there are two postdocs Dr. Charlotte Christensen from the University of Zurich and Dr. James Klarevas from Max Planck Institute of Animal Behavior, two PhD students Mina Ogino from University of Zurich and Tobit Dehnen from the University of Exeter and Max Planck Institute of Animal Behavior, and four MSc students in the project. The Kenyan team includes Brendah Nyaguthii, the field manager and prospective Ph.D. student (Australian National University); Sikenkeny Kipkorir, field assistant presently completing his MSc, (University of Nairobi); Wismer Cherono, senior field assistant; and Monicah Wambui and John Wanjala, both field assistants. We also had the honor of hosting a prospective Kenyan Ph.D. student, Risper Hamisi, on our project for her to gain more field experience in December 2022.



*Fire in one of the
controlled burns
in KLEE.*

Prescribed burns in Kenya, Long-term Exclosure Experiment (KLEE)

Website: <https://tpyoung.ucdavis.edu/klee>

Compiled by **Duncan Kimuyu**

In February this year, we completed yet another round of prescribed burns in KLEE. This is a follow-up on previous burns conducted in 2013 and 2018. We are interested in the effects of different herbivore groups on plant responses to burning, as well as the effects of fire and herbivory interactions on soil organic carbon.

KLEE is one of the long-term research projects at Mpala. It was established in 1995 to determine the separate and combined effects on savanna ecology of herbivory by cattle, elephants, and other wildlife species, as well as fire. It consists of 18 large (ten-acre) experimental plots that can be viewed as representing: (a)

different land uses (management for cattle, wildlife, or both) or (b) the sequential loss of large wild herbivores.

The overall project has thus far generated over 200 peer-reviewed and outreach publications, making KLEE the most scientifically productive field experiment ever carried out on the African continent. The KLEE plots have promoted collaborations among scientists from across the globe, producing cutting-edge research and additional embedded experiments. These studies have been highly influential in identifying the myriad ways that ecological communities are structured and function, and in particular how such insights can inform management and conservation actions.



© Ryan Samsing

Above: The burning crew consisting of field assistants and students from Kenyan Universities and Goshen college.

The Zebra Project

Compiled by **Rosemary Warungu**



The Mpala Zebra Project is a multifaceted one. Not only does it examine the basic ecology, behaviour, and demography of both plains and Grevy's zebras on Mpala and neighbouring conservancies and group ranches, it also examines issues of human-wildlife interaction, especially with respect to cattle and human economic and social wellbeing.

Zebra Demography, Habitat Choice and Movement Ecology

To determine the demographic structure and stability of zebra populations we record the individual identity and habitat locations of Grevy and plains zebras across seasons in Laikipia, mainly on Ol Jogi, Mpala and Ol Pejeta Conservancies. We drive predetermined loops taking photos of all individual zebras, and recording reproductive status and habitat within the group. Individual identities are determined from these images using the Detection and Hotspotter algorithms of WILDBOOK which we have been instrumental in helping develop. From repeated sightings we can assess seasonal ranging and, habitat preferences as well as demographic features associated with survival and reproduction.

The Great Grevy's Rally

Due to the heavy drought that affected most parts in Kenya, we could not conduct the rally this year. Drought had decreased the availability of grass for the endangered Grevy's zebras to graze on, and the only way to help them survive drought was by feeding them. The Grevy's Zebra Trust and KWS led the way and for five months repeatedly fed approximately 500 zebras by providing over 24,000 bales of hay, 12,000 Kilos of lucerne pellets and almost 2,000 Kilos of nutritional supplements. Still, 120 deaths were recorded of which over half were attributed to the drought. That foals accounted for 24% of the deaths and resulted from excessive worm burden led to the addition of deworming medicines to the food supplements.

Grevy's Zebra Genetics

Although movements of known individuals are being followed based on repeated sightings, the degree of population sub-structuring remains obscure. By collecting dung from photographed individuals, genomic sequencing of known individuals becomes possible. This will not only tell us the degree to which individuals of subpopulations actually mate with individuals of other subpopulations. Such information will

reveal whether inbreeding is a problem and it will provide valuable information on paternity so that genetic effective population size estimates for the species as a whole or for subpopulations. The total genomic analysis also reveals which traits are undergoing selection and what genetic bottlenecks have existed throughout the population in the past. This year we focused on Grevy sampling of stripe images and dung in various conservancies in and outside Laikipia. The reserves and properties sampled across three counties were:

- Samburu National Reserve-147
- Buffalo Springs national Reserve-106
- Sarova Shaba-59
- Evans-1
- Kipepeo -10
- Ol Maisor-54
- Sosian-89
- Suyian-14

Such sampling will help:

- Determine the genome of individual Grevy's zebras by location;
- Identify the diets of Grevy's zebras over time and space since there will be many repeat samples;
- Reveal the microbiome of the zebras to determine if changes occur and if so, they accord with seasonal diets; and
- Enable the creation of social networks to see how they accord with genetic networks of association.

Zebra Stripes

One of the fundamental unanswered questions that remains unresolved is 'why do zebras have stripes? Many possible explanations have been proposed, ranging from confusing attacking predators, to enhancing social cohesion, to reducing biting by disease carrying flies, to regulating body temperature. To date the best empirical evidence supports the hypothesis that stripes make it harder for flies to detect zebras at a distance. Experiments we conducted by putting hides of zebras and dun-colored mammals in a plexiglass chamber with *Stomoxys* (stable) flies reaffirmed this result and showed for the first time that these flies equally avoided skins of both zebra species irrespective of their stripe thickness. With respect to fostering social cohesion, we have also shown that both melanic (mostly black) and white (cream colored with white stripes) zebras are not socially ostracized and have high reproductive success.

Evidence supporting the ‘dazzle confusion’ and temperature regulation hypotheses are harder to come by. Last year, filling 10-liter water bottles covered with black cloth (like a cape buffalo), white cloth (like a white zebra) and striped cloth (like a true zebra) with either cold (17°C) or hot (55°C) water, we showed that bottles with stripes heated at slower rates than black bottles and cooled faster than all white bottles. Surface temperatures were also lower on the striped bottles when compared to the solid-colored ones. This demonstrates that more is going on than passive absorption of solar radiation or reflection. Some sort of active process, most likely convective flow, is involved. But do these temperature dynamics occur in living organisms? Since we can’t work closely with actual zebras, we spray painted donkeys white and then spray painted them again with black stripes. We also attached topical iThermometers to measure core body temperature which were transmitted to our smartphones. And we used our infrared sensing gun to measure surface temperatures. As with actual zebras, the surface temperatures of the striped donkeys were lower than the unpainted controls roaming in the same herd. But most intriguingly, the core temperatures were lower than the controls as well. Although not all the data has been analyzed, the trend is suggestive that stripes can lead to cooling of both the surface and internal body. As a result, stripes

seem to reduce biting by flies while at the same time enabling rapid cooling when heating has reached harmful levels.

Student Research Projects:

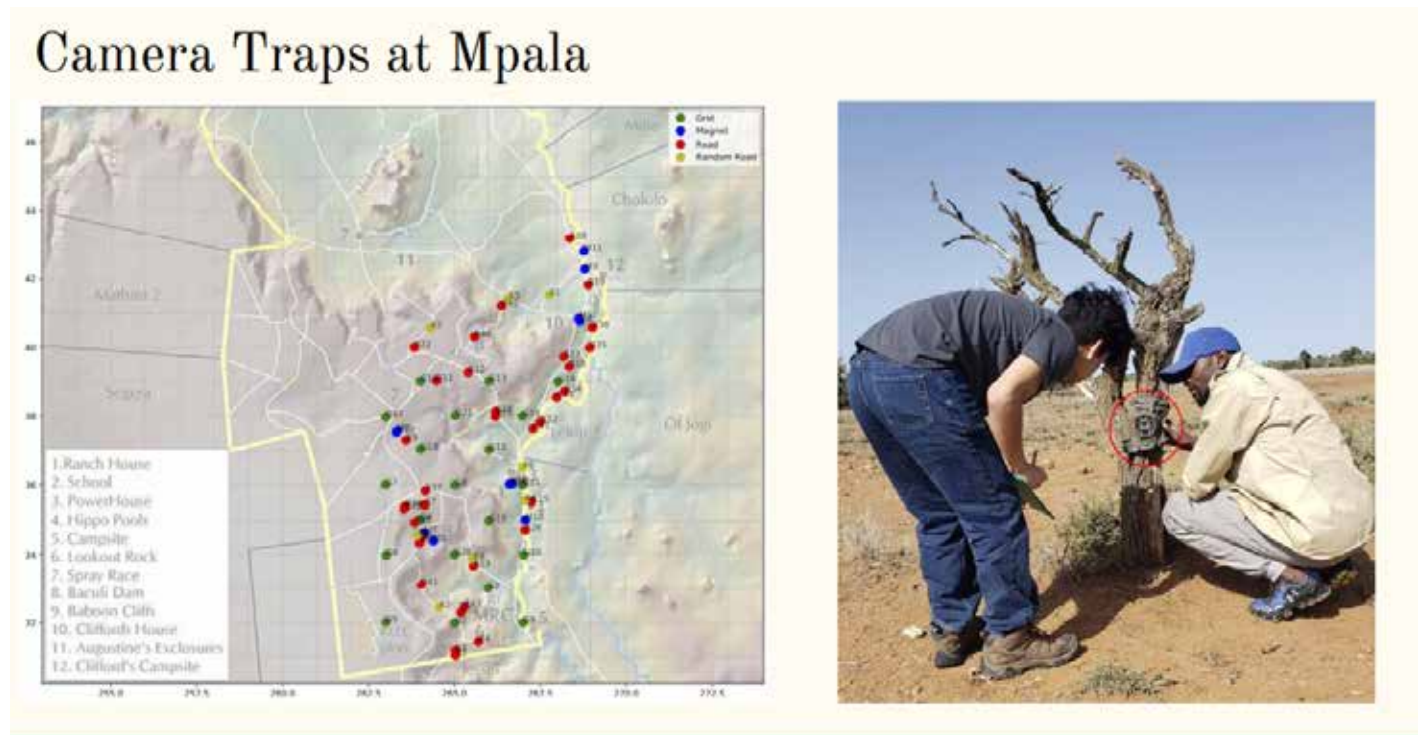
Severine Hex: A PhD student from Princeton University who has been collecting zebra data at Ol Pejeta conservancies in Laikipia for the last three year continued with her research. Her study involves social Behavior, Cognition, Communication, and Development in the Plains Zebra. Our long-term data collected at Ol Pejeta guided her on demographic structure, movement and population stability.

Her research seeks to answer two broad questions:

- Are multimodal and multicomponent signals modified by social and ecological contexts?
- Do individuals in different social positions and life stages use multimodal communication to navigate their social worlds in similar or dissimilar ways?

Her fine-grained coding of the behavioral elements comprising communicative sequences is being analyzed using network theory to identify the nature and composition of modules that cluster signals that are unique or shared with other modules. In this way signatures associated with specific contexts can

Below: Location of camera traps within Mpala.



be detected and characterized.

While filming zebra interactions, Severine observed an incident of attempted infanticide and how aid and signaling by group mates prevented the death of the newborn. This case study has been published as *“An observation of attempted infanticide and female-female cooperation in wild plains zebras”*. Three more aspects of her thesis have been submitted for review.

Sara Beery: A graduate student from Cal Tech deployed 100 camera traps in 2020, positioning them at Mpala waterholes, along roads and at random points on the landscape to capture photos of the animals to assess time budgets in space and time and determine if differences among species or by sex or reproductive state within species influences habitat preferences. From a statistical perspective, the distribution of cameras across habitat types will also help determine if there are biases associated with different camera positionings. The zebra project team has been assisting in monitoring those cameras. This year, she came to reposition the cameras to focus on areas where animal population is high.

Zebra team has played a key role in helping the above researchers with zebra photo identification using WILDBOOK stripes recognition software to provide important baseline data on who, where and when individuals were sighted. Such data provides the foundation for helping determine the process behind the biological patterns that emerge from our fine-grained sampling of zebras on a variety of landscapes.

PEI Summer Internship Program.

The students focused on 4 experiments.

1. How intensive cattle grazing affected zebra habitat choice by examining home range changes before, during and after cattle use an area. Photos captured by driving new loops, were identified using WILDBOOK software. Preliminary results suggest that both zebra species change their feeding locations when cattle arrive and intensively use a grazing area. While plains zebras tend to avoid areas of heavy cattle use only sharing areas where cattle densities and impacts are minimal, Grevy's zebras regularly feed on the edges of areas where cattle impact is high.
2. The second experiment involved examining how habitat use overlap

between both Grevy's and plains zebra and cattle might affect growth rate in cattle. One herd of livestock was grazed in areas where Grevy's and plains zebra had been observed grazing while movement of the other herd was based of where the herders want the cattle to go, as is the usual situation

3. The third experiment involved interns helping Prof. Rubenstein with his painted water bottles and donkeys to determine whether or not stripes reduce internal water or bod temperatures more than solid-colored bottles or bodies.
4. Since water is ultimately the lifeblood of both zebras and cattle they interact with, the fourth project assessed alternative irrigation practices of upstream crop farming. If water conservation can be increased without reducing crop yield, then a win-win situation for wildlife and people will emerge. By helping measure the amount of water saved and drop yields by deploying drip irrigation rather than flood irrigation, the students played a central role in helping evaluate ways of reducing human-wildlife conflict.



The zebra project team led by Prof. Dan Rubinstein (in the middle).

Filming the Black Leopard and Wildlife at Mpala

Compiled by **Mercy Wambui, Production Coordinator – ClementWild Ltd**

Our film company is led by wildlife photographer and cinematographer Clement Kiragu. We have the pleasure to partner with Mpala on our first film project, partly funded by National Geographic. As we document the beautiful black leopard, Mpala is providing accommodation for 40 days a year and introducing us to neighboring conservancies, and in exchange, we are documenting the beautiful landscape, people and animals at Mpala to create and catalogue an Mpala image and footage bank and produce two cinematic short films about Mpala and its wildlife, among several other professional services.

We arrived at Mpala on 12th July, 2022, in search of the mythical and elusive Black Leopard, as well as to document the landscape and other wildlife for the

Mpala short films. Mpala provided us with a ranger and guide with whom we scouted the vast landscape, narrowed down to the cave where she was nurturing her young cubs, yet it took us 17 days of searching before we got to film the beautiful cat.

Mpala was instrumental in introducing us to Laikipia Wilderness, where we got access and got to film for nine days the more habituated black leopard that lives at the Northern border of Mpala and Laikipia Wilderness.

We believe that education through the power of photography and film will play a vital role in bringing predators and African communities closer, promoting co-existence and inspiring pride and ownership of our natural heritage. With

three short films in development, we seek to work with partners in the film industry to explore Clement's artistic skills and in-depth knowledge of animal behavior to create impactful wildlife films. We hope to be part of making films that will bring a change of mindset that can give wildlife and nature a fighting chance.

Mpala is one such partner with whom we are working with to tell the stories of the beautiful wildlife that lives within protected spaces in Laikipia.

This is an exciting project that will not only create a film about one of the rarest wild cats in the world, but also beautifully tell the story of Mpala, its people, and the amazing work they do to further science, education, and conservation.

San Diego Zoo Wildlife Alliance



Trainings, Workshop and Meetings



© Mariana Carvalho

Above: TBA course participants on a hike at Mt Kenya.

Below: TBA course participants at Mpala River camp.



© Mariana Carvalho

i) Tropical Biology Association (TBA)

For the last 27 years (since 1995), Tropical Biology Association has been in forefront in championing for training, capacity building and networking, especially from young scholars from underrepresented backgrounds. This year, Mpala is proud to have partnered with TBA in hosting two intensive field courses that drew representation from a wide range of participants in Europe and Africa. The first course, conducted in August, took one month and had 24 participants from 10 African nationalities and 8 European nationalities. The second course, on 'designing projects in the field', was conducted in October and had representation from 23 participants all from Africa. Additionally, through TBA we also hosted a one-week training on 'Theory of Change' to 18 Whitley Award winners drawn from all across Africa

ii) Wild dog and Cheetah Workshop

Between 26 th -30 th September, we hosted Wild dog and Cheetah Workshop at Mpala. The agenda for the meeting was to review and revise the eastern Africa regional conservation strategy for cheetah and African wild dogs. Wild dog and cheetah are facing increasing threat in their range countries. Developing coordinated strategies for their conservation is the only way to secure viable and ecologically functioning cheetah and wild dog populations. The workshop had 45 participants and it drew representation from local, regional and international conservation agencies, NGO's and funders. We are optimistic that deliberations from this meeting will go a long way in securing the future for wild dog and cheetah, as well as other carnivores in the region.

iii) Turkana Basin Institute (TBI) Fall 2022 Field School

We were glad to host TBI for yet another field course this fall. TBI continues to be our strong partner in training and research. This year's course brought together eight undergraduate students, four of which were Kenyans. The students spent one week at Mpala exploring natural history of East African Flora and Fauna and the course was led by Dr. Dino Martins.

iv) Laikipia Conservancies Association (LCA) Annual General Meeting

On 5 th Oct 2022, we hosted a the LCA annual General Meeting. LCA is a member- led organization comprising 11 private ranches and conservation areas, including Mpala. LCA aims at bringing together conservancies in Laikipia to address common challenges and amplify our individual impacts. The October AGM was attended by 40 participants from the member conservancies. The meeting held fruitful deliberations on concerted efforts in management of the member conservancies.

Outreach activities



Photos: © Martin Muangi

Above: Some of the volunteers who participated in the 2022 LRVC (above). James Ngatia, the lead vet for the 2022 LRVC.

The Laikipia Rabies Vaccination Campaign

Compiled by **Martin Mwangi**, Photos by **Celine Wandia**

The Wild Dog Project has been running annual domestic dog and cat vaccinations against rabies and canine distemper virus

(LRVC). The campaign is aimed at eradicating the diseases from the Ewaso Nyiro Ecosystem, where wildlife, human, livestock, and domestic

dogs frequently interact. In recent years, there have been mass wild dog deaths in the ecosystem from the diseases. Domestic dogs are the host for rabies, which makes vaccination critical for its control.

Having skipped year 2021 due to limitations brought about by COVID-19, resumption in 2022 has meant a new hope for conservation and the general health in the ecosystem. Starting mid-October 2022, the campaign ran for 6 weeks, with 13,018 dogs and cats vaccinated for rabies and 4000 for distemper.

Close to 3000 doses will be administered by the end of February 2023.

The campaign has brought together stakeholders and partners including the Laikipia County Government-Veterinary and Public Health Departments, general communities within the ecosystem, conservancies, private individuals, community leaders, researchers, and volunteer students from Karatina University. It has presented one of the most efficient public-private partnership in achieving a one health goal in the area.

Daraja Transition Programme

Compiled by **Martin Mwangi**, Photos by **Celine Wandia**

On 27th May, the head of HR was invited to Daraja Academy to coach the girls who were transitioning from high school to college on how to prepare for job interviews and how to select their career path. This is an annual engagement, as part of the partnership between Mpala and Daraja.



© Beatrice wanyohi



Above: Some of the imaged captured on MpalaLive Cameras

Mpala Live

Compiled by **Valerie May, PI** and executive producer, **MpalaLive**

M[palalive.com](https://mpalalive.com) continues to draw millions of visitors to our live cams and the educational content on mpalalive.org, as well as to our sponsor and collaborator explore.org. We are an educational digital outreach program focused on spreading the conservation message and inspiring a new generation of conservation biologists. We started the project in 2013 and launched the website and live cams in 2014. The project is supported by the Annenberg Foundation and its offshoot, [Explore.org](https://explore.org). Explore is the world's leading philanthropic live nature cam network, with 137 live streams globally. We work closely with explore.org to distribute MpalaLive's content throughout their social media and website venues.

Website

MpalaLive.org's core offering is the live cams stationed on a bend of the Ewaso Ng'iro river

at the "hippo pool." These live feeds appear both on mpalaLive.org and the explore.org websites.

The educational content on MpalaLive.org includes an interactive **Field Guide**, featuring 213 species (possibly the most complete resource for East African animals available online); **Stories from the Bush**, with 39 archived live chats and short videos describing the research and wildlife of Mpala; a **Classroom**, featuring downloadable lesson plans and classroom activities geared to US and Kenyan students from grades 1 through 12; and **Live Cams/Best of Mpala**, featuring 28 curated wildlife videos.

In 2022 mpalalive.org drew 181,769 users and 271,590 page views. These stats exclude visitors to the live cams. More than 44% of the traffic is to the Classroom section, which is also the



most significant landing page for the website. This indicates that educators have bookmarked this section and return regularly to utilize the content. The top five search terms in 2022 were: lion, giraffe, elephants, zebra, and hippo. The top three countries of origin for visitors were: USA (26%), Philippines (16%), India (14%).

Live cams

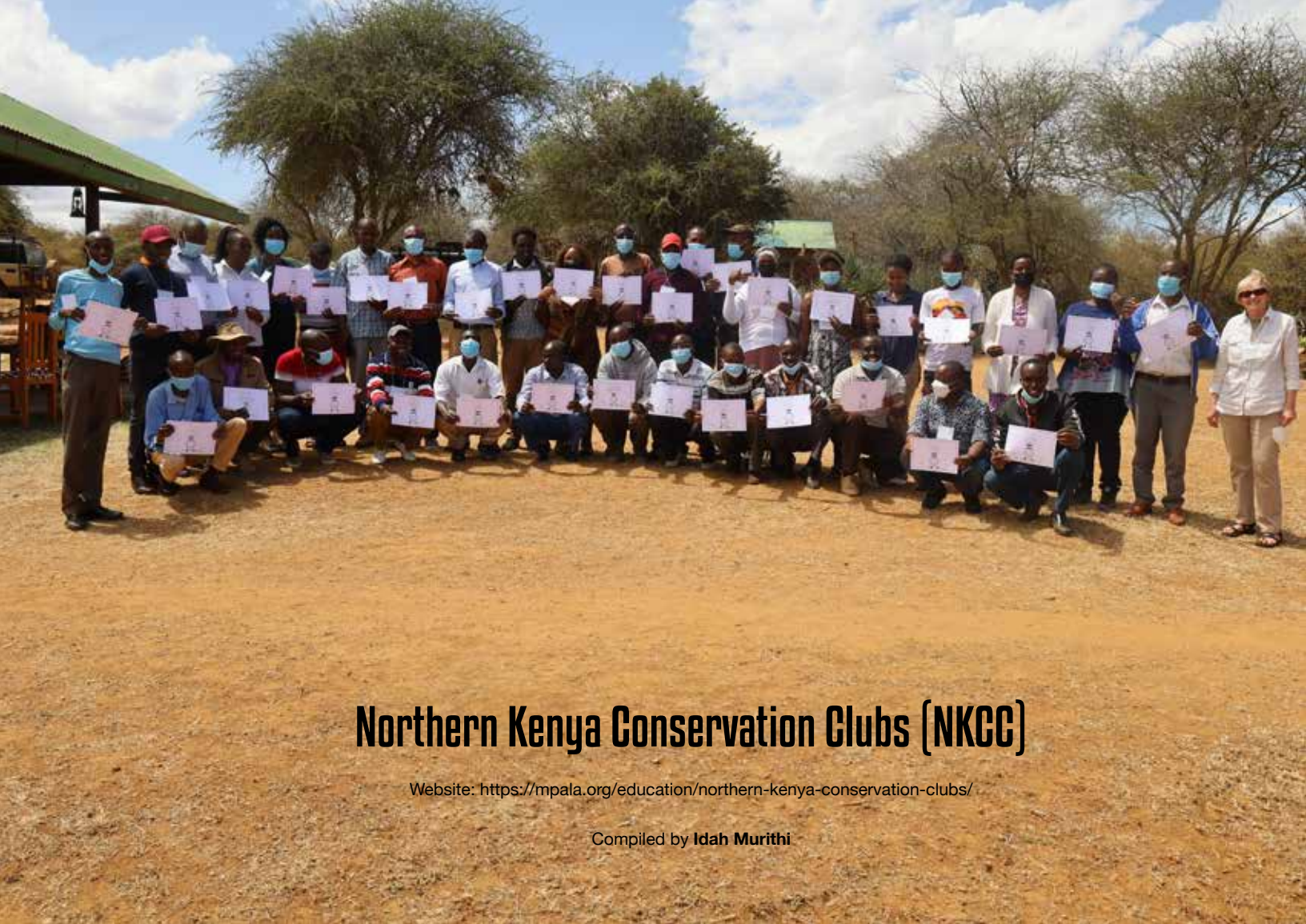
Traffic stats to the live cams for 2022 are 1.5 million visitors and 1.8 million page views. Further, on YouTube 1.4 million folks viewed edited clips from mpalaLive's cams. Explore.org distributes our live cam content through various channels, including YouTube video shorts. One video from the cams showing a lion predating a plains zebra garnered 2.2 million views, the highest of any of the 137 cam streams from all over the world sponsored by Explore. All content is branded with mpalalive.org.

One of the unusual features of our live cams is

the excellent broadcasting provided by our live cam operators, Fred Kiboko, Anne Mukoma, and Everlyne Ndinda. They pan and zoom onto the most intriguing animal behavior available on the live streams. They are ably supported by explore.org cam operators during their off hours. This curated approach to viewing is how we were able to capture the dramatic lion kill described earlier, as well as a closeup view of a pride of six lions drinking at the hippo pool. The team also answers viewer questions on our message board often linking to the online field guide and drawing from their own deep knowledge of our ecosystem.

An ongoing challenge for us is broadening our Kenyan audience. In the upcoming year we hope to strengthen our in-country educational outreach. The success of this project lies with the dedicated efforts of our team: IT lead Joseph Iruru, and cam ops Fred Kiboko, Anne Mukoma, and Everlyn Ndinda. We also welcome back Victor Kasii as our digital media producer.

Above: Some of the imaged captured on MpalaLive Cameras



Northern Kenya Conservation Clubs (NKCC)

Website: <https://mpala.org/education/northern-kenya-conservation-clubs/>

Compiled by **Idah Murithi**

2022 has been a bittersweet year for NKCC. Stick around to the end of the article to learn why.

2022 saw the lifting of Covid-19 restrictions, which meant club activities were back with a bang!

In January we held our annual conservation Educator's Workshop, which provided a benchmarking avenue for NKCC club teachers.

This also meant the continuation of our internship program. NKCC welcomes undergraduate students who are passionate about uniting community and conservation through the annual summer teaching assistants internship program. This year we hosted three summer interns, Rio Baran and Connie

Gong from Princeton University, and Idah Murithi from the African Leadership University.

23rd July saw the resurrection of our annual community conservation day after three years due to the Covid-19 pandemic. This is an annual environmental-style fair, which brings together the community, the pupils, scientists, and leaders from all over the world. It is an opportunity for NKCC members to showcase to the world what they have learnt as members of the club. This year we had over 1200 people attend the NKCC Community Conservation Day.

From the shores of Kilifi to the slopes of Mt. Kenya, after almost a year of waiting the Elephant Queen mobile team finally made its debut at Mpala. For 21 days,

we carried the story of Athena across the Northern Laikipia landscape, bagging yet another win for the fight for elephant conservation.

This was quite the year for our club members, as we also learnt how to further tell the conservation story through puppeteering with Stone Lion Puppets.

NKCC is a brainchild of Nancy and Daniel Rubenstein, founded in 2009 as an outreach program for Professor Dan Rubenstein's research on Grevy's zebra in Samburu.

Sixteen schools later, Nancy and Dan have done a tremendous job in steering NKCC to the conservation education powerhouse it is today. But as Patrick Lumumba once said, A good dancer



must know when to leave the stage. Nancy and Dan had their final NKCC dance in the summer of 2022. We are all beyond grateful for the massive impact NKCC has had on the community. Under the Rubenstein leadership, lives have been transformed and ecosystems restored. We wish you all the best as you enjoy your retirement.

The mantle has now been passed onto Mpala Research Centre and the NKCC team to steer the project into even greater success!

Above and previous page: some of the participants in conservation Educator's Workshop held at Mpala.



Photos: © Idah Murihi

Engagement with Local Communities

Compiled by **Fardosa Hassan**

In 2022 we increased engagement with our neighboring communities by reaching out more and making visits to the community with students and guests that come to Mpala. Student groups got a chance to visit the communities, interact with them, get to learn their lifestyle and most importantly the culture.

In 2022 we had four student groups visit Il Motiok Community and six student groups visit Lekiji Community. In addition, faculty and administrators from Princeton University and Aga Khan University visited the community as part of their itinerary to Mpala. This helped

them understand the community around Mpala better. The groups were from George Mason University, Princeton University, University of Glasgow, and University of Utah.

Towards the end of the year, we hosted three football teams from Lekiji, Maramoja and Endana for a match with our Mpala football team. This is one of the activities that helps us continue to keep a good relationship with our neighbors. Mpala values working and engaging with the local communities, and our hope is to reach out more through such activities and also extend our support to them.

***Below:** Mpala playing against Lekiji football team.*





Photos © Fardosa Hassan

School Feeding Program

Compiled by **Fardosa Hassan**

For the third year we have continued to support 11 neighboring primary schools with meals during their final exams. These are our partner schools under the Northern Kenya Conservation Clubs. 2022 has been a challenging year due to the prolonged drought, and most schools haven't had food. A total of 824 students benefited from our school feeding program this year.

List of schools we supported:

- Reteti Primary School
- Il Motiok Primary School
- Naiperere Primary School
- Ngabolo Primary School
- OL Gir Gir Primary School
- Kimanjo Primary School
- Ewaso Primary School

- Musul Primary School
- Lekiji Primary School
- Nkiloriti Primary School
- Nosirai Primary School

"We are so grateful to Mpala for donating food to ensure we are comfortable while sitting for our final exams. This year we can't count the number of days we have gone without having food. Just by seeing tomatoes my stomach feels full!" one of the students said.

Since we started distributing meals for candidates sitting for their exams, the schools have shown improvement in their performance.

Scholarship Opportunities Through Mpala

Meet Janet Naserian, our most recent George Small Fund Alumnus

Hi, my name is Janet Naserian. I'm a 22-year-old young lady from Lekiji Community. I was born in a family of two with one sister and a single mother. My mother passed on when I was 9 years old, and life has never been the same. As an orphan girl I couldn't see a chance for me to continue with my studies after primary school. I have known Mpala since I was young, especially through the Northern Kenya Conservation Clubs, where I was a member when I was in primary school. I emerged at the top in my class, attaining a total of 308 marks out of 500. In 2015 I applied for the prestigious Mpala George Small Scholarship to support my high school education. When I received the news that had been awarded the scholarship, I was very happy, since I knew that my dreams are going to be achieved in life. The four years' scholarship allowed me to complete my high school education without any interruption. My tuition fees were fully covered through the scholarship, and I also received some extra funds for upkeep. Being an orphan, I was really happy for the scholarship since there was no one who would come to my rescue to take me to school. I really thank Mpala for standing in as a parent to support me all through.

The scholarship impacted my life a lot, as I didn't imagine a girl like me from a small village would one day join University. I worked hard in high school since I knew what I want with life, I knew my dreams are valid. After my four years in high school, I attained C+, which is the qualifying grade for university admission. I joined South Eastern Kenya University, where I am currently pursuing a bachelor degree in Education Art's department of Humanities and Social science.

In conclusion I can proudly say that if it wasn't Mpala George Small scholarship I wouldn't be where I am right now. I am truly grateful to Mpala may God continue to grant you the good heart of changing life of many.





Meet Monica Ngasike, our most recent Mwangaza Scholarship fellow

I am Monica Ngasike, a student at Karatina University pursuing an MSc degree in Environment Studies. I hail from the rural areas of Laikipia, where more girls don't get opportunities to further their studies to tertiary level. I completed my undergraduate program in 2019, thanks to the financial support from the Mwangaza scholarship.

Mwangaza scholarship supported my undergraduate studies for four years, and every year I was motivated to work hard so that I would present good grades to the board. I learnt about Mwangaza through Professor Daniel Rubenstein, who agreed to find ways to support me after hearing about my story. This opportunity really came in good time when I needed it the most.

Mpala Research Centre as an organization is of great importance and especially to us, the local community that have benefited from scholarship opportunities. After receiving my KSCE results, I had done exceptionally

well, but deep down I was worried whether I will be able to join University because of our financial challenges back home. I was heartbroken when I was asked to defer my studies for one year due to lack of funds to support my education. Mwangaza scholarship restored my dreams of pursuing university education. The scholarship catered for all my school expenses for the four years. The funding was wired through Mpala Research Centre. This opportunity has positively impacted my life through equipping me with skills and knowledge gain to compete with the rest of the world.

I am proud of my accomplishment, and I remain an example for young girls in my community to emulate. I am determined to become an exceptional female environmentalist and conservationist, and this pushed me to seek more funding support from the Mwangaza scholarship in order to pursue my master's degree in Environment Science. Pursuing my master's degree will help me gain more knowledge and experience

which will ultimately allow me to come up with smart solutions for problems affecting my community. Environmental Science is a critical field, as humanity depends on the environment and its resources for daily survival – more resources should be channeled toward research and solutions in this field. Additionally, this degree will also help me to come closer to my dream of being a professor in the field of environmental science and conservation. I am glad that this field has and will enable me to impact lives through environmental conservation.

Finally, I am grateful to Mwangaza Scholarship, Professor Daniel Rubenstein and MRC for this chance that has been of positive impact to my life. The exposure and knowledge gained over the years has made me treasure education even more because of the opportunities they present. I am now a good communicator, confident, intelligent, and a good listener. I hope many more girls will get to benefit like me.

Mpala in the News

How tech is helping us talk to animals

Researchers are using drones, AI, and digital recorders to create a "zoological version of Google Translate."

By Neel Dhanesh | [@neel_dhan](#) | [neel.dhanesh@gvoxx.com](#) | Oct 20, 2022, 7:00am EDT

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An African elephant throws mud on itself at the Mpala Research Center and Wildlife Foundation, near Rumuruti, Laikipia District, Kenya. Elephants have been shown to communicate using infrasound, which exists below the human range of hearing, and new technology is helping researchers decode what those sounds might mean. | Source: Maina/AFP via Getty Images

Rare Grevy's zebras among wild animals at risk due to dry spells



Grevy's zebras at Mpala Conservancy in Laikipia County

Mpala Research Centre hosts U.S. Ambassador to Kenya Meg Whitman '77

Earth Sciences, Princeton Institute for International and Regional Studies

Nov 24, 2022, 10:00am

During fall break, a group of senior Princeton academic leaders and administrators — with expertise in infrastructure, operations, information technology, safety and facilities — visited the Mpala Research Centre in Laikipia County, Kenya, and were joined by the newly sworn in U.S. Ambassador to Kenya Meg Whitman '77 and her husband Dr. Giff Harsh for an overnight visit. Whitman, the former Hewlett Packard CEO and Princeton residential college namesake, was a mere 10 weeks into her role when she and a small retinue from the U.S. Embassy in Nairobi made the journey to tour the research center on Oct. 24.



At the Mpala Research Centre on Oct. 24 (left to right): Meg Whitman '77, U.S. Ambassador to Kenya; Chris Kuenne '85, Keller Center for Innovation in Engineering Education; Executive Vice President Treby Williams '84; Beatrice Wamalwa, Environment Office USAID Kenya; Donna Tatro, Office of Information Technology; Kevan Higgins, U.S. Embassy, Nairobi, Kenya. Photo by Evans Ogeto.

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ON THE LAB

Why Do Some Birds Form Mixed-Kin Groups?

Shalee Shah, GSAS'22, explains why superb starlings may have evolved to live in groups in which unrelated birds help raise others' offspring.

By Kim Martineau
March 02, 2022



The Current

SCIENCE + TECHNOLOGY

Sharing More Than Water

Warring tribes bring together wildlife, and their parasites, on the plains of Africa

By Harrison Tsouf
Tuesday, January 11, 2022 - 10:07 Santa Barbara, CA



Herds of 10 Elephants (Camelopardalis) provide water for wildlife and humans

Photo Credit: (CC) Africa 101/2022

Download Image



The year has been the year of the elephant in the world as herd sizes fell on the dusty ground. A herd of 10 elephants, which congregates around a watering hole to quench their thirst during the region's dry season.

But it's not only the region's herds and herders that are gathering in 2022's season.

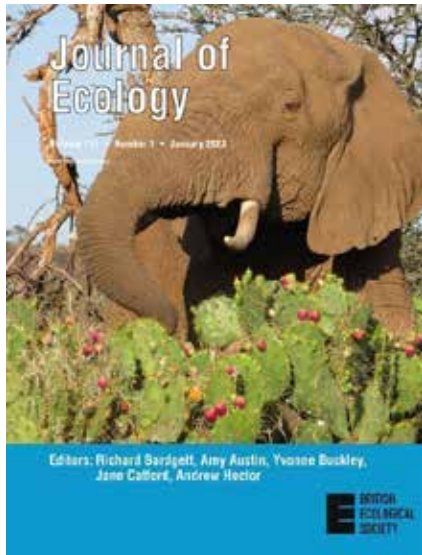
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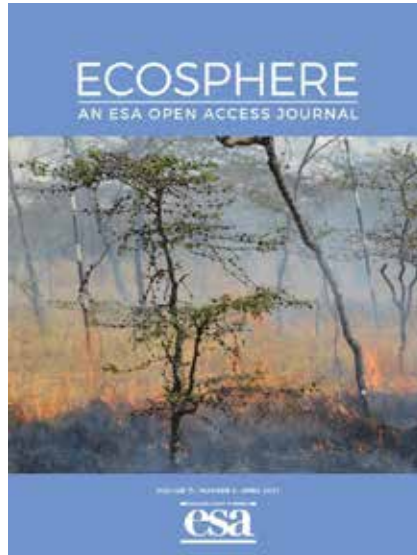
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Featured publications



An elephant feeding on exotic cacti (*Opuntia spp.*) in an African Savanna. Findings from research conducted by Harry Wells and colleagues at Mpala (<https://doi.org/10.1111/1365-2745.14010>) show that wild herbivores enhance resistance to invasion by exotic cacti, and add to evidence that conserving and restoring native herbivore assemblages (particularly elephants) can increase community resistance to plant invasions. *Photo by Gustavo Lozada*



To examine the interactive effects of large herbivores and previous burns on fire behavior, Young and colleagues (<https://doi.org/10.1002/ecs2.3980>) conducted a series of 36 controlled burns in the Kenya Long-term Exclosure Experiment (KLEE - <https://tpyoung.ucdavis.edu/klee>) at the Mpala Research Centre. The fires burned the grassy understory, top-killing saplings but not adults of the mono-dominant tree *Acacia drepanolobium*, triggering mass evacuations of their symbiotic ants. Their research found multiple measures of fire behavior in the controlled burns were positively correlated and found, despite certain differences between the fires conducted in 2013 and those in 2018, strong indications of postfire resilience. Photo credit: Dedan Ngatia.



Research conducted by Liu and colleagues (<https://doi.org/10.1098/rsbl.2021.0639>) shows that not only do the bright colors of the African monarch butterfly warn potential predators that it is toxic, but they may also play a role in regulating its temperature. Their work, published in *Biology Letters*, shows that Monarch butterflies with darker wings are more common in cooler regions.

Publication List 2022

This year's list of publications is a true reflection the continued energy, passion, and curiosity of the multidisciplinary research community at Mpala. Most importantly, Mpala has been making successful efforts to increase the representation of Kenyan scholars in research and publications. Out of all the 52 papers published this year, 13% of them were led by Kenyan scientists and students, and more than 50% of all publications included Kenyan coauthors. Mpala publications featured in top-tier journals like *Science*, *Global Ecology and Biogeography*, *Science Advances*, *PNAS*, *Philos. Trans. R. Soc. Environmental Research Letters*, *Ecology* and *Journal of animal ecology*. Below, is a list of all publications from research conducted at Mpala in 2022;

1. Achee, Nicole L. 2022. "The Remote Emerging Disease Intelligence—NETwork." *Frontiers in Microbiology*, 3382.
2. Benka, Valerie A. 2022. "Expanding the Scope of Challenges to Human-Wildlife Coexistence, and the Implications for Conservation: A Case Study of Laikipia, Kenya." *Human Dimensions of Wildlife*, 1–17.
3. Broekman MJE, JP Hildbers, M AJ Huijbregts, T Mueller, AH Ali, ... DI Rubenstein, et al. (2022) Evaluating expert-based habitat suitability information of terrestrial mammals with GPS-tracking data. *Global Ecology and Biogeography*, 31(8):1526-1541. doi.org/10.1111/geb.13523
4. Cizauskas, Carrie A, Alex D Washburne, Joseph E Knelman, Christina B Hansen, Antony Mwangi Nderitu, Peter Lokwamo Esinyon, Andrew Dobson, and Andrea L Graham. 2022. "Natural Helminth Infections Reduce Relative Abundance of Inflammation-Inducing *Prevotella* in Wild Primates." *BioRxiv*. 494558
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6. Dehnen, Tobit, Danai Papageorgiou, Brendah Nyaguthii, Wismer Cherono, Julia Penndorf, Neeltje J Boogert, and Damien R Farine. 2022. "Costs Dictate Strategic Investment in Dominance Interactions." *Philosophical Transactions of the Royal Society B* 377 (1845): 20200447.
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9. Freeman, Patrick T, Robert O Ang'ila, Duncan Kimuyu, Paul M Musili, David Kenfack, Peter Lokeny Etelej, Molly Magid, Brian A Gill, and Tyler R Kartzinell. 2022. "Gradients in the Diversity of Plants and Large Herbivores Revealed with DNA Barcoding in a Semi-Arid African Savanna." *Diversity* 14 (3): 219.
10. Gijnsman, Finote. 2022. "Facultative Cleaning of Spiral-horned Antelope by the African Paradise Flycatcher (*Terpsiphone Viridis*)." *Ecology and Evolution* 12 (7): e9080.
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12. He, Peng, James A Klarevas-Irby, Danai Papageorgiou, Charlotte Christensen, Eli D Strauss, and Damien R Farine. 2022. "A Guide to

13. Hex, Severine BSW, Margaret Mwangi, Rosemary Warungu, and Daniel I Rubenstein. 2022. “An Observation of Attempted Infanticide and Female–Female Cooperation in Wild Plains Zebras (*Equus Quagga*).” *Behaviour* 159 (13–14): 1341–64.
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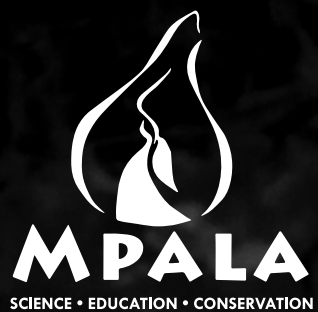
Collaborators



A photograph of two zebras in a savanna landscape. The zebra in the foreground is facing left, and the one behind it is facing right. They are both looking towards the left. The background is a blurred savanna with dry grass and trees under a clear blue sky.

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