

Grevy's Zebra Conservation in Kenya 2023/24

**Report & funding proposal prepared for
supporters & members of the
Grevy's zebra EEP conservation projects**

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www.marwell.org.uk/conservation

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- Zoo de Montpellier
- Zoo Frankfurt
- Zoo Planckendael



Cover: Grevy's zebra females, N. Kenya © Marwell
This page: Grevy's zebra, Kisima, Kenya © Marwell

Introduction

Dear friends and supporters of the Grevy's zebra. It gives me great pleasure to deliver to you our most recent report on the conservation activities for Grevy's zebra in Kenya. I am delighted that this report is more positive than the last one and that our team is not currently battling a drought or other natural disasters. For this reason, the last year has been a lot quieter and allowed people, wildlife and our team to gather strength again. This does, however, not mean that the year was uneventful. A lot has happened as you will see in the report for 23/24, and we have had new people joining our efforts.

We are still in a period of increased cost for almost everything and we thank you, our funders, for your steadfastly and generous support. Your funds and personal encouragement make our work possible and gives it the security to continue, even if things at times turn difficult.

In this document you will find more information on the collaring we did last year, including some first findings, and a major effort was to undertake another national survey, the first Great Grevy's Rally since the pandemic and drought years.

Our Kenyan team, the communities and many school children and herders, and I would like to thank you for staying with us and providing much needed funds year after year.

Thank you!!

Section A. Summary of Activities in 2023/24

In this section we provide an overview of the work we have carried out towards Grevy's zebra conservation over the last year. Together with our partners from the Grevy's Zebra Technical Committee (GZTC) and with your financial support we have provided crucial monitoring, cooperation with communities, emergency interventions, and support for the Kenya Wildlife Service (KWS) and the national conservation strategy.

In **Section B** we are presenting our proposed activities for 2024/25 together with their associated costs and I hope you will find time to read it.

Groups and organisations mentioned in this report are:

GZT = Grevy's zebra Trust www.grevyszebratrust.org

GZTC = Grevy's zebra Technical Committee

KWS = Kenya Wildlife Service www.kws.org

Lewa or LWC = Lewa Wildlife Conservancy www.lewa.org

MT = Milgis Trust www.milgistrust.com

MW / Marwell = Marwell Wildlife www.marwell.org.uk/conservation

NRT = Northern Rangelands Trust www.nrt-kenya.org

PU/Princeton = University of Princeton www.princeton.edu/~equids/people.html

WRTI= Wildlife Research and Training Institute www.wrti.go.ke



National developments

National Conservation and Management Strategy for Grevy's zebra in Kenya

All our work is in support of the Grevy's Zebra Recovery and Action Plan (2017-2026) (KWS, 2017). A face-to-face meeting of all parties is planned before the end of 2024 to finalise the review of the current Grevy's zebra strategy. Marwell Wildlife Programme Manager Lizbeth Mate and David Kimiti, Director of Research and Impact at Grevy's Zebra Trust (GZT), are taking the lead on this process.

Grevy's Zebra Technical Committee

Drought Relief

Following the terrible drought, large areas of Kenya were plagued by floods (Pic.01). The rainy season began in October when heavy storms caused rivers to overflow, flash floods and landslides that resulted in over 70 human casualties and widespread damage. 36 counties out of 47 were affected, mostly the eastern and north-eastern ones, bordering with Somalia and Ethiopia, respectively. Over 45,000 people were displaced and a total of nearly 95,800 families affected throughout Kenya. Luckily, our communities and scouts did not suffer any human losses. Our scouts, did, however, report cases of sickness in all their localities as well as mosquito infestations in three areas, leading to fear of a malaria outbreak.



Pic 01: Floods in northern Kenya © Marwell



Pic.02: Grevy's in lush vegetation © GZT

On a positive note, the scouts reported lush pastures and vegetation (Pic.02) at the beginning of this year which is still the case in August 2024 despite a lack of rain for some time. Hopes are that there won't be a repeat of drought conditions this year, but we are ready to respond if and when needed.

Monitoring of Grevy's zebra

National Survey of Grevy's zebra/Great Grevy Rally (GGR)

We reported previously (Langenhorst et al. 2023) that the Rally due in 2022 had been delayed due to the drought. This caused the Grevy's zebra to be in suboptimal body condition and it would have been a risk to submit them to a survey that often could be a stressor when trying to approach groups or individuals.

The first GZTC meeting of 2023, organised after the rains had arrived and landscape and animals were beginning to recover decided for the next GGR to take place on January 27th and 28th 2024.

In 2024, GGR was a somewhat reduced event: minimal funding due to increases in costs globally, loss of some corporate funders and the aftermath of pandemic and drought period were to blame. Both Lizbeth, our project manager, and Enrita, our field coordinator, were involved in the planning. In the week before the Rally, our scouts were sent out more frequently to identify where the zebra were so they could be more easily found on the survey days. Enrita, Lizbeth and Sakimba (field assistant), together with 50 volunteers, met in South Horr just before the weekend to undergo training and final planning for GGR (Pics.03-05). Survey areas were mapped, and teams put together and assigned to each area. The Marwell team were, of course, given responsibility for the NKGP areas.



Pics 03-05: scouts during training and preparation for GGR © Marwell

A large team of motorcycle volunteers (Pics.06-07) helped with locating and photographing zebra during the survey. Close to 14,000 images were collected over the two census days, with teams recording 1,938 individual Grevy's zebra sightings on Day 1 and 2,314 sightings on Day 2. Some areas had to be excluded from the survey due to insecurity but also due to some roads being unpassable after the rains.

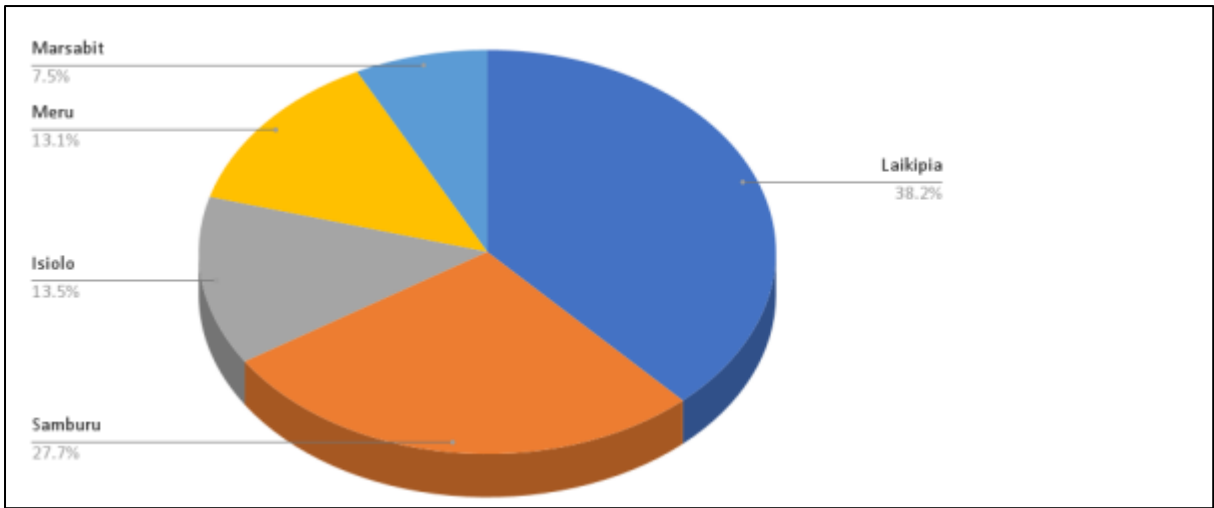




Pics 06-11: Scouts locating and photographing Grevy's zebra (top and middle); Lizbeth and Sakimba planning next steps (bottom left) and Grevy's zebra tracks © Marwell

The data collected have given us several insights into Grevy's zebra density and distribution.

As with previous rallies, Laikipia County led the way with the highest proportion of Grevy's zebra sightings (38.2%), with Samburu also recording a significant proportion of individuals sighted (27.7%) (See Graph 01). More detailed analysis is still in progress, but we are cautiously optimistic, that the population has survived the preceding drought reasonably well. The scouts reported a lot of foals being born at the beginning of 2024 which will also help.



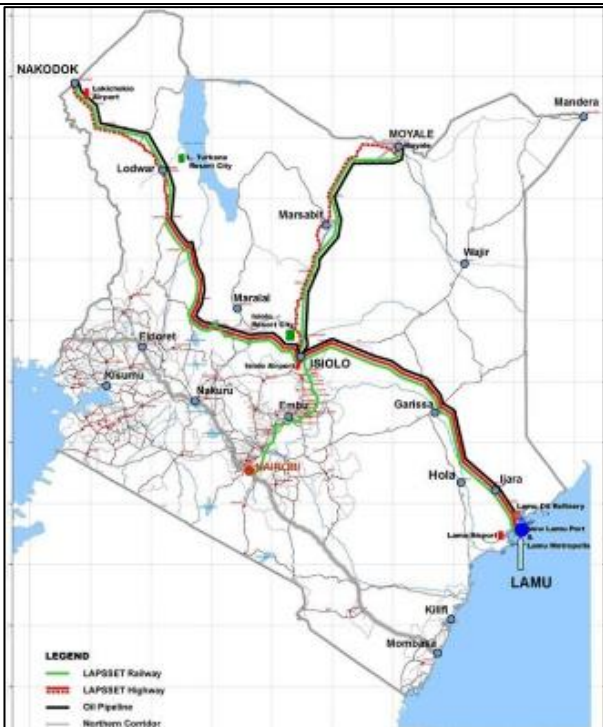
Graph 01: Proportion of Grevy's zebra seen by County during the GGR 2024 © GZT

GZ collaring

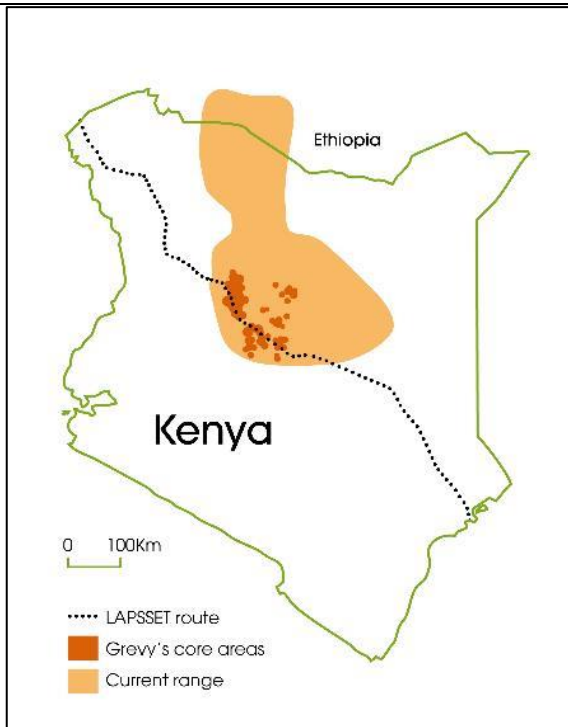
As previously reported (Langenhorst et al. 2023), large scale linear infrastructure projects that form part of Kenya's growth and development blueprint, are in the design phase, and will cut directly through Grevy's zebra habitat in northern Kenya (Maps 01 & 02). Smaller scale development projects at the county level are also in line for advancement. These infrastructure projects are recognised as the greatest emerging threat to the Grevy's zebra population in Kenya.

In response, KWS therefore requested support for a collaring project that aimed to identify which habitats are critical for Grevy's zebra distribution, dispersal and movement, and why these areas are important. The information gathered with satellite telemetry (collars) will give us the evidence required to mitigate the threats to the species by informing planning and conservation management decisions for Grevy's zebra and other wildlife, in particular along the LAPSSSET Corridor*.

*The Lamu Port-South Sudan-Ethiopia Transport (LAPSSSET) Corridor is a flagship project for Kenya under its development blueprint, Vision 2030. It includes a standard gauge railway, crude oil pipeline, electricity transmission line, highways and a 100km-wide LAPSSSET economic zone, which cut directly across core Grevy's zebra habitat. See below maps (Figures 01 & 02)



Map.01 LAPSSSET corridor © public domain



Map 02: simplified crossover Grevy's zebra core & corridor © MW

In September 2023, this long planned collaring operation became reality at last. We worked closely together with KWS, the Wildlife Research and Training Institute (WRTI) and Grevy's zebra Trust to collar a total of 20 Grevy's zebra over a 10-day period. The KWS lab team collected blood and tissue samples, while GZT, Marwell and WRTI took morphometric data on each animal that was sedated for collaring. GZT and Marwell were given sole responsibility for collar assignment and activation.

In a first field trial of its kind, the KWS capture team used a mobile scale for estimation of weight of the zebra (Pic.12).



Pic.12: First ever deployment of digital weighing platform on wild Grevy's zebra © KWS

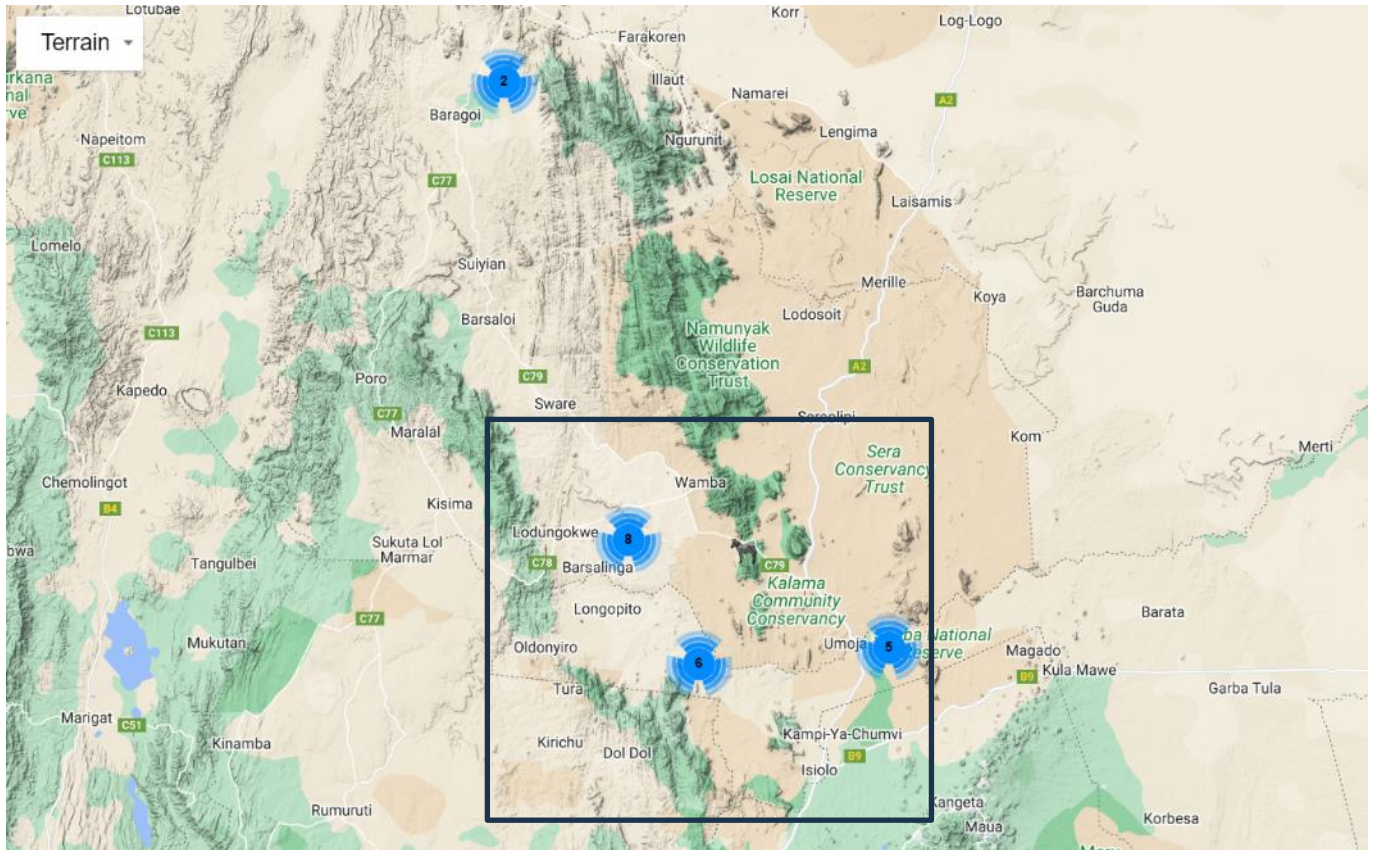
The Grevy's zebra in the national reserves proved to be very skittish. This posed a challenge for the capture teams, and it became clear that collaring would not be as fast as planned. The first day mostly served to identify issues with protocols and adjusting them to the high temperatures, animal welfare and unforgiving terrain. The El Barta area in particular proved to be difficult as it is a volatile region with a high frequency of conflict and insecurity making all herds extremely nervous and nigh impossible to dart. In the end, we only managed to collar 20 animals (Tab.01), not 22 as planned. The last two collars will be deployed by GZT and KWS when an opportunity arises.

Location	Number of collars
Buffalo Springs National Reserve	7
Westgate/Kalama Community Conservancies	4
Shaba National Reserve	3
Nasuulu Community Conservancy	3
El Barta Region Baragoi	2
Samburu National Reserve	1

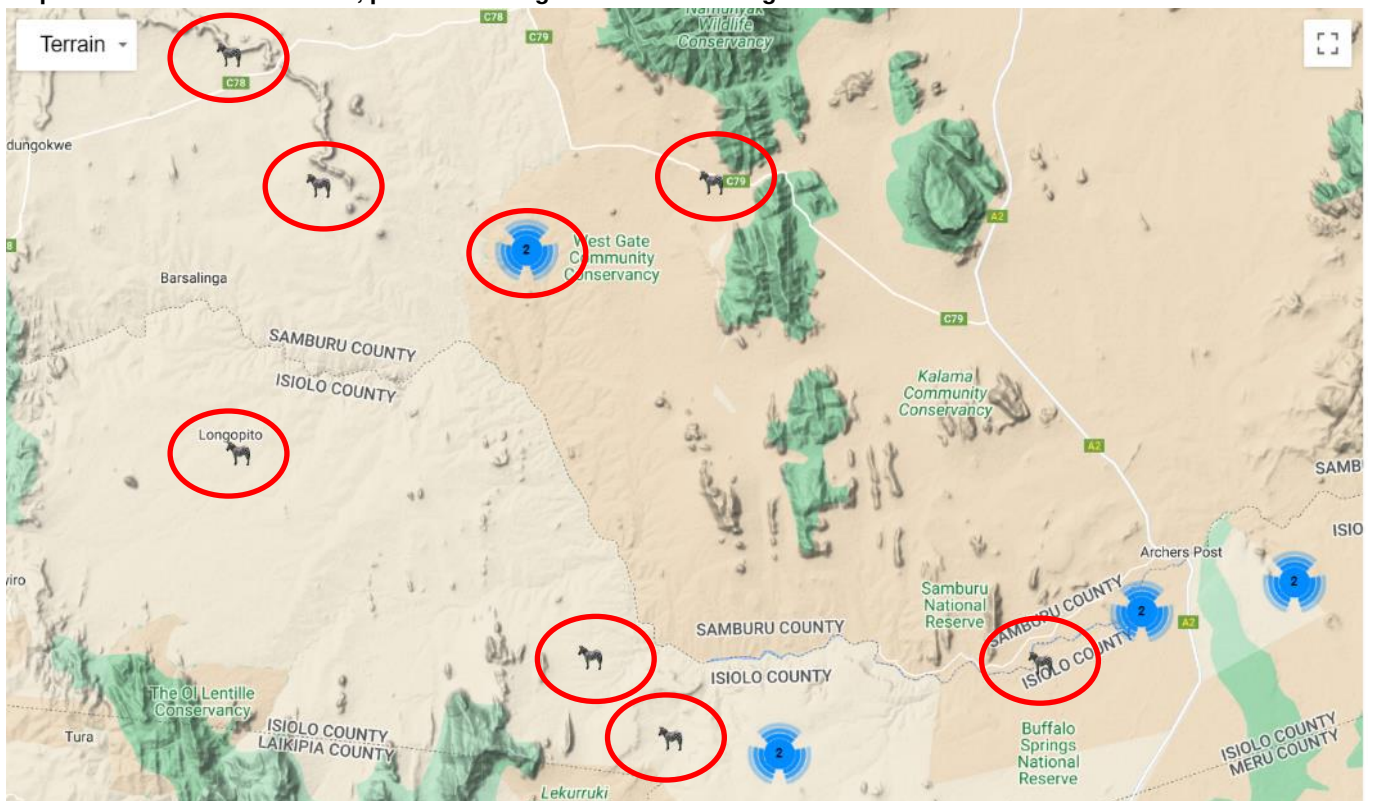
Table 01: Number of collars deployed per location © GZT

All collars were set to collect position information every 6 hours, and to upload these location data to the cloud twice a day or every 12 hours (Maps 03 & 04). These intervals were selected to prolong collar

life while giving useful information back. However, these intervals can be changed at any time depending on any specific short-term questions that the team might seek to answer with regards to corridor use or daily migration. Two of the deployed collars failed within a few weeks of activation, and efforts are underway to locate the individuals through their VHF signals. The collars will then be removed and sent to the vendor for analysis and hopefully redeployed.



Map 03: Overview of all collars, produced using Savannah Tracking software



Map 04: Zoom in on Map03: sites of individual Grevy's zebra, produced using Savannah Tracking software

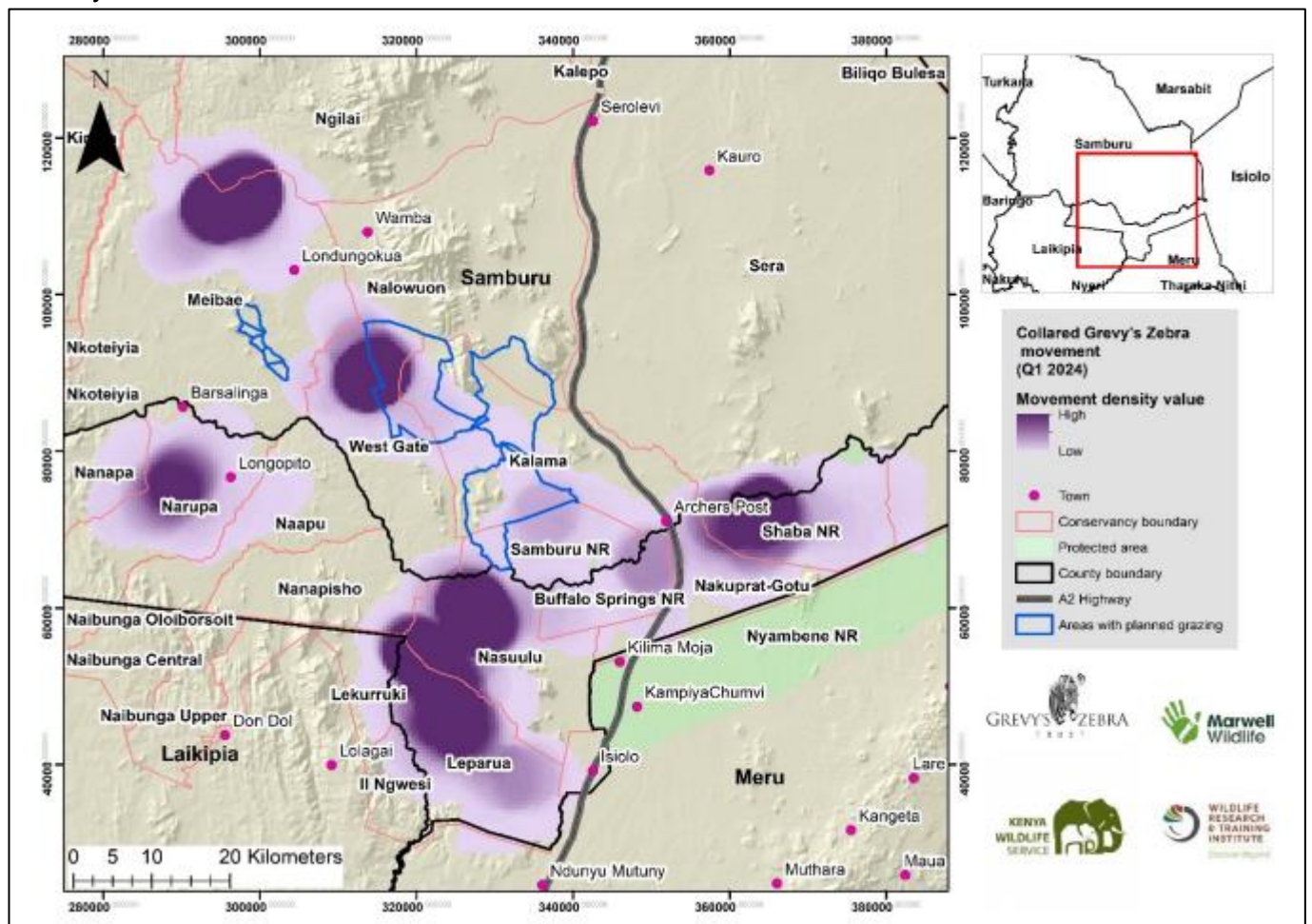
Movements in Q1 2024 – first results

In the first quarter of 2024, the collared Grevy’s zebra spent 76.4% of their time within community land, 21.2% within protected areas and 2.4% within County Conservancies. Shaba National Reserve, Leparua, Nasuulu and Narupa community conservancies were main hotspots within Isiolo County. Meibae and Westgate community conservancies were the main hotspots in Samburu County (see Map05).

The Grevy’s zebra movement data confirms the existing wildlife corridor between Shaba National Reserve and Buffalo Springs National Reserve. Movements show multiple crossings over the A2 highway (Isiolo to Marsabit), as Grevy’s zebra access critical resources on both sides. The LAPSSET Corridor will also follow the alignment of the A2. These critical crossing points are shared with multiple species, including those classified by IUCN as endangered, such as reticulated giraffe, cheetah and wild dog.

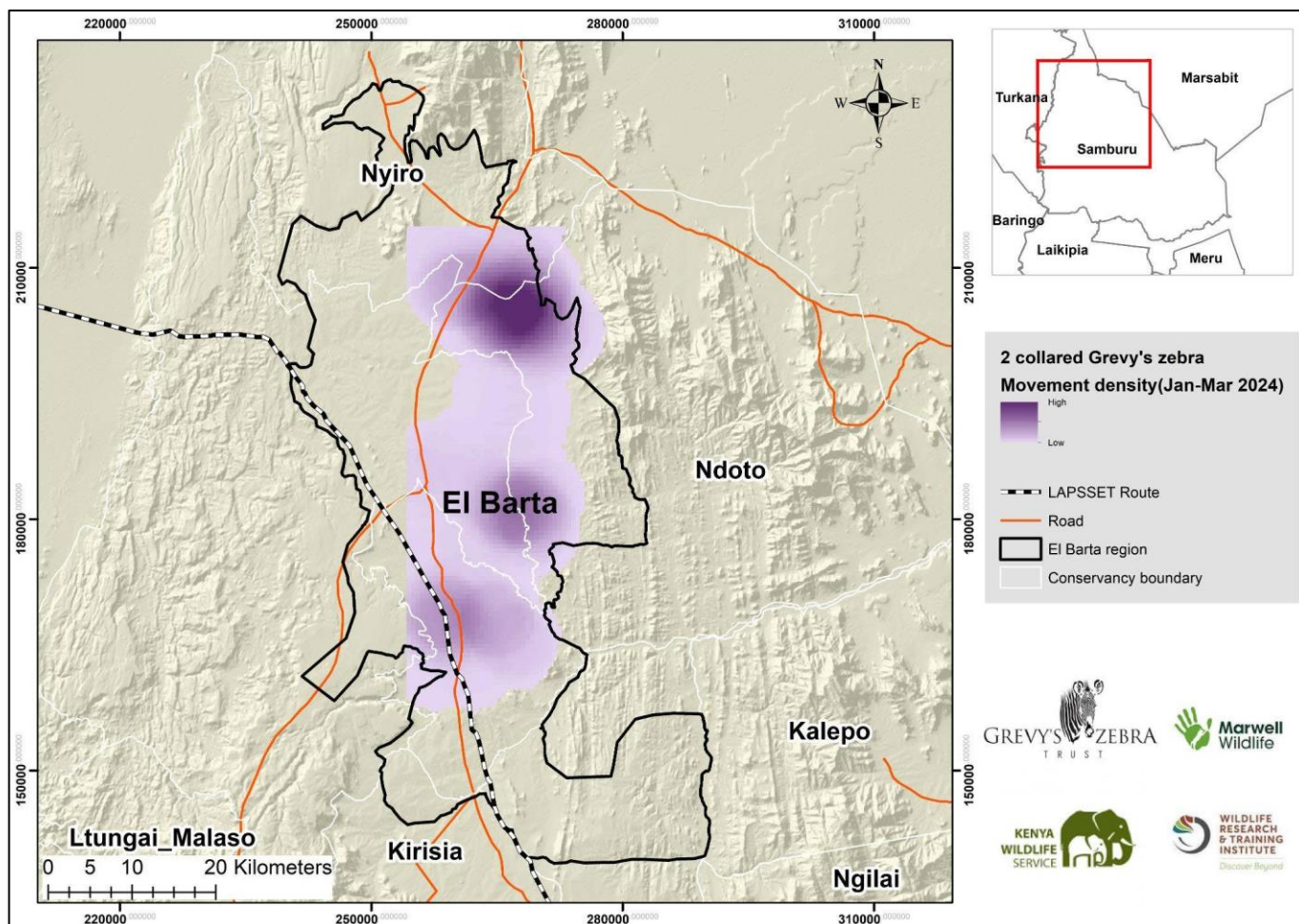
Nine cases of wildlife vehicle collisions on the A2 were also recorded within Q1. Among the wildlife killed was a Grevy’s zebra, two cheetahs from one family, a striped hyena and a jackal.

GZT gave a presentation to the Kenya Wildlife Service Director General on A2 road kills mitigation in January.



Map 05: Distribution and movement of 17 collared Grevy’s zebra during Q1 across Wamba and Isiolo Regions © GZT

Two more collars were deployed in the El Barta area where we know Grevy’s zebra occur, but we don’t know much about their connection to other areas and populations. These two collared Grevy’s zebra mostly stayed in Ndoto Conservancy but also spent some time at Nyiro and Baragoi Conservation Area (Map 06).



Map 06: Movements of two Baragoi collared Grevy's zebra (Jan-Mar 2024)

Recommendations

Early recommendations to minimize the negative impacts of infrastructure development on Grevy's zebra and other wildlife are: underpasses should be integrated on the mapped corridors within the Isiolo-Moyale A2 road. The LAPSSET project should also secure corridors along other wildlife hotspots and water resources.

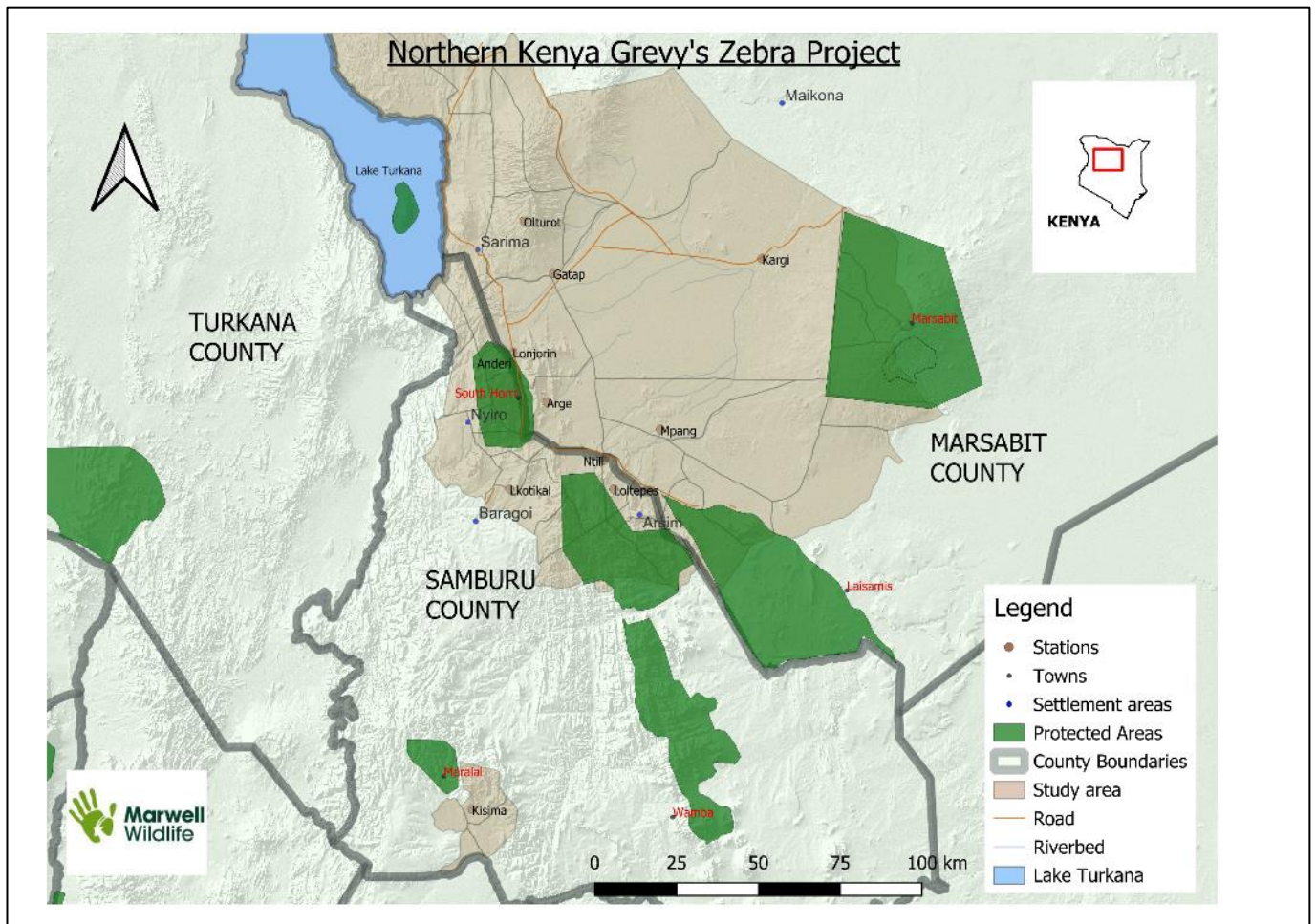
Digital Stripe Pattern Identification Project

Photos of the uniquely identifiable stripe patterns of Grevy's zebra allow us to get exact numbers of animals seen in any area and avoiding double counting individuals.

Future of national stripe ID database

The stripe ID database has been in a suboptimal state for several years now. GZT, Lewa and Marwell are all still collecting images and storing them in the old Access Database ExtractCompare (Conservation Research Ltd., Hiby, 2010) that was first introduced in 2006. We will continue with this for the time being. Having discussed alternatives with several organisations, there is still no one software that can deliver what is needed at an acceptable speed, without major bugs and at affordable cost. GZTC will continue to search for an alternative but for now we are settling on getting reliable estimates of numbers rather than precise counts of individuals. What is needed for conservation management are trends and we can get that with the existing methods.

The Northern Kenya Grevy's Zebra Project (NKGZP)

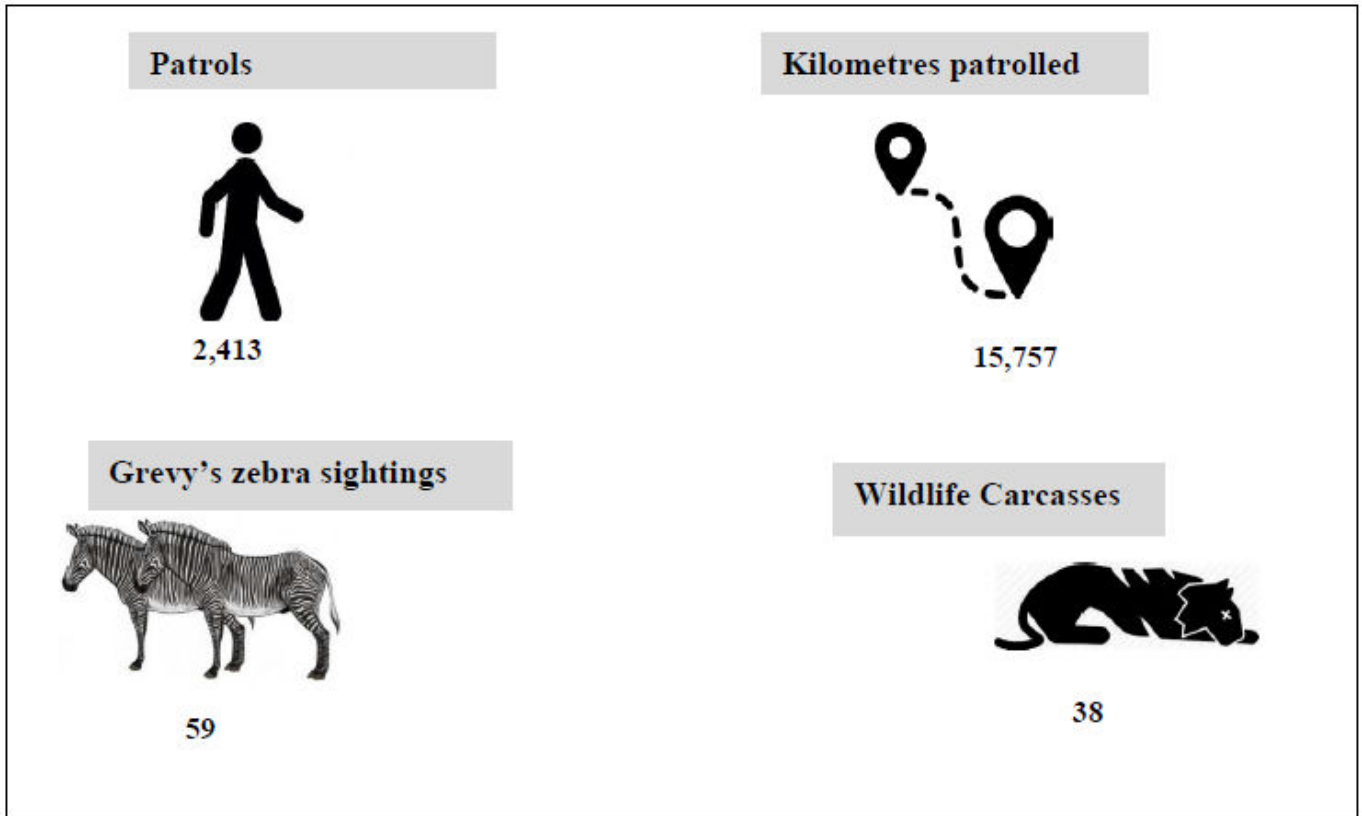


Community-based monitoring, using SMART technology.*

Once more our scouts have increased number of patrols and distance walked compared to the previous year. Our 24 scouts (6 women ,18 men) also further improved quality of data with the support from our field assistant, Sakimba Lesoloyia, and recently from the new assistant Joshua Lolkireri who will be the first source of help for the scouts from now on. He is giving them feedback on their data collection and helps with any technical issues of phones or camera traps. As reported many times before, the scouts use SMART enabled phones to collect data on wildlife, dead or alive, and set up camera traps every night to monitor what is happening overnight.

*SMART (Spatial Monitoring and Reporting Tool, <https://smartconservationtools.org>) is an open source and freely available software application. This software makes it possible to collect, store, communicate and analyse scout-collected data on wildlife, illegal activities, patrol routes, and management actions to understand where efforts should focus, and evaluate scout performance.

The following infographic (Graph 02) and maps show a summary of the 2023 patrol efforts:



Graph 02: Infographic on SMART data results for 2023 © Marwell

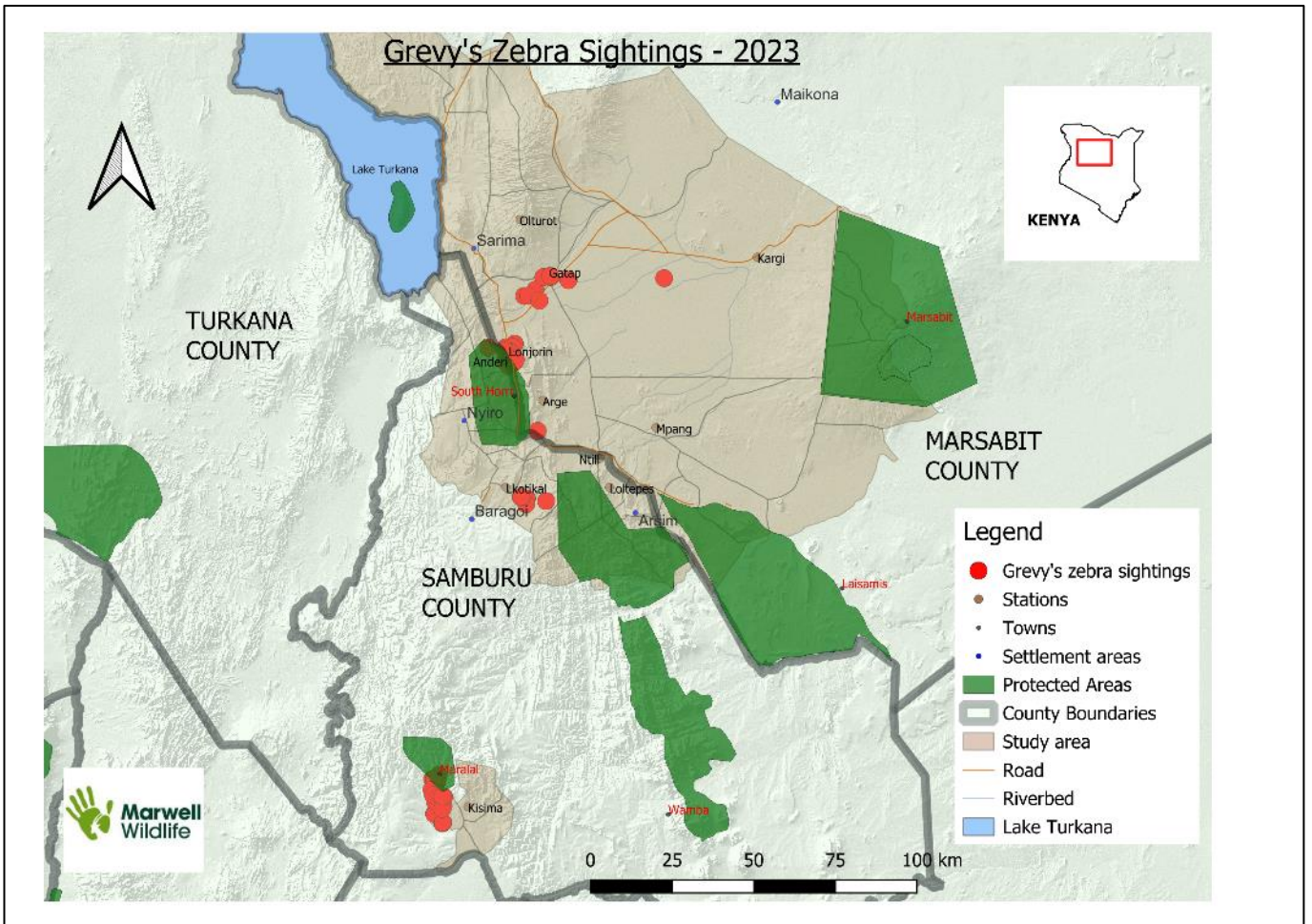
The scouts patrolled a distance of 15,757 km totalling to 2143 patrols. Compared to 2022 this was an 11% and 9% increase in distance and patrol respectively

We recruited two scouts, one in Kisima and another in Gatap (Saitoti) following reports of frequent Grevy's zebra sightings there.

Grevy's zebra sightings

Grevy's zebra observations more than doubled in 2023 compared with 2022. There was a marked increase in observations between August and December which is when data collection in Kisima and Gatap commenced. Data shows that the observations were in Kisima, Gatap and Lkotikal. The high observations in December in Lkotikal could also be attributed to higher vigilance on the scouts as they searched for wildlife in preparation of the GGR that took place in January 2024. The scouts were requested to increase patrolling with the hope of sighting Grevy's zebra to inform which areas to send volunteers to during the GGR and to count as many Grevy's zebra as possible.

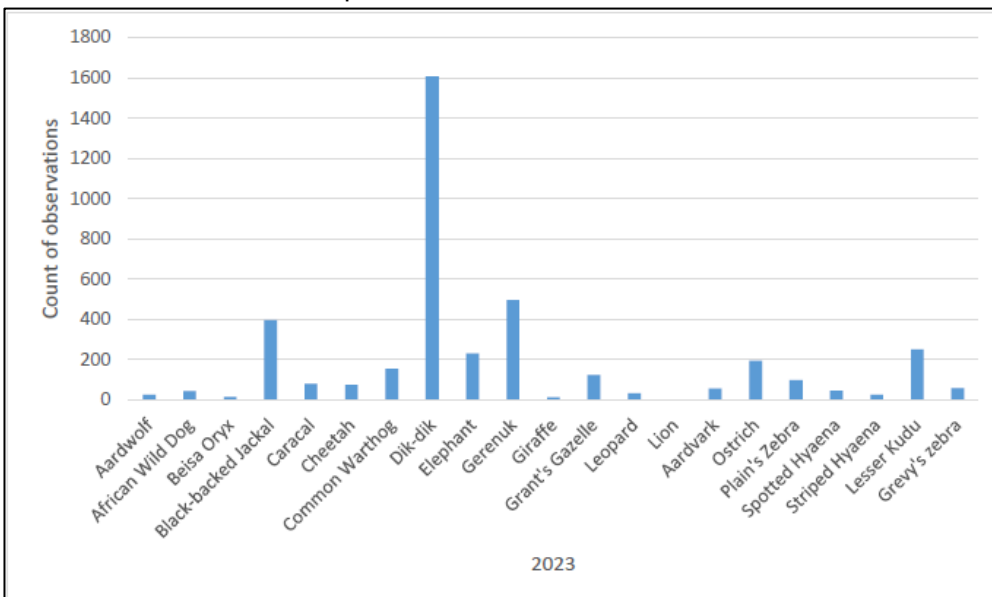
A total of 59 encounters with Grevy's zebra were recorded with a total of 75 individual Grevy's zebra; five small groups and one large group of adult males; two small groups and two large groups of adult females; two small groups and one large group of lactating females (see Map 08).



Map 08: Grevy's zebra sightings in 2023 © Marwell

Other Wildlife sightings

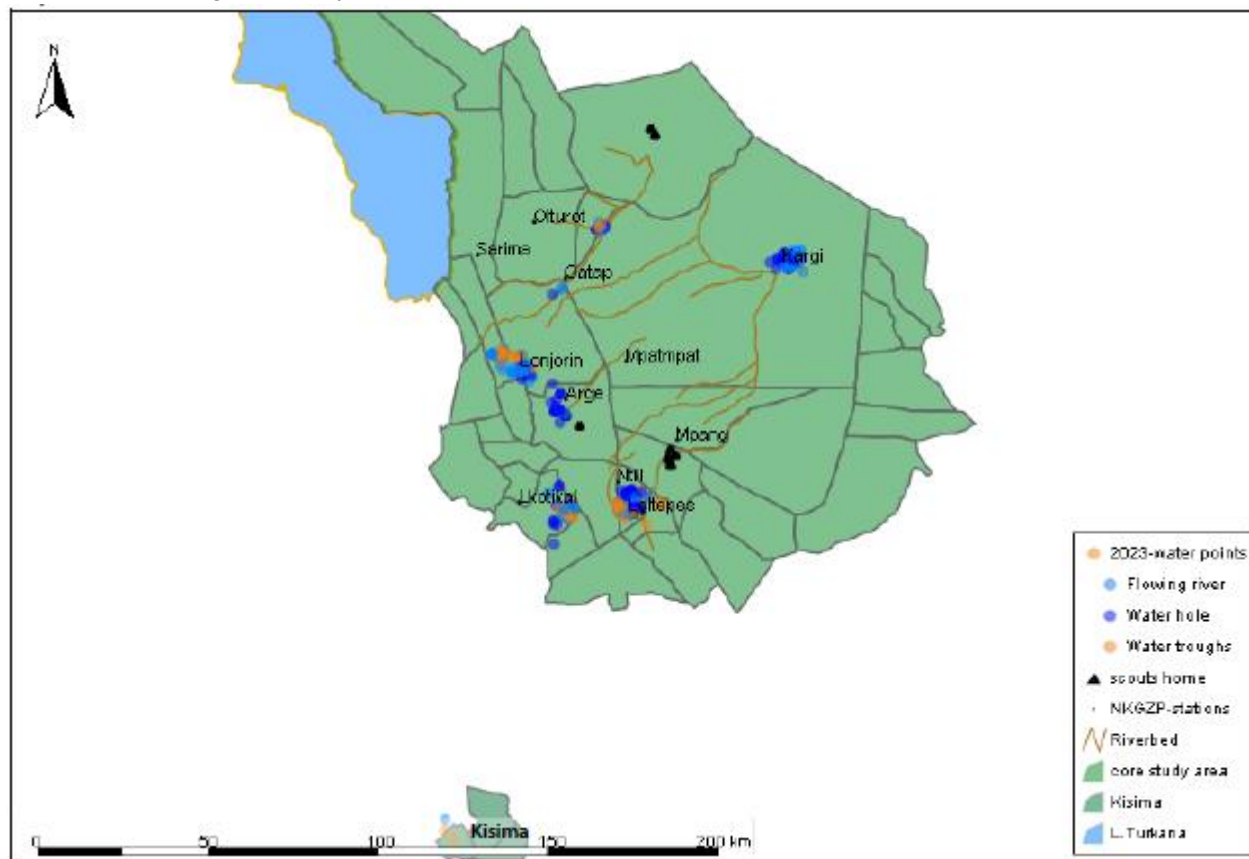
A total of 21 species were recorded by the scouts (Graph 03). There were more animals sighted in 2023 than in 2022 which could be attributed to expanding the coverage by adding two stations (Gatap and Kisima) in the third quarter of 2023. The most noticeable increase is of Grevy's zebra and plains zebra, and decrease is in leopards. The most sighted carnivore was the black-backed jackal with 395 counts of observation compared to 330 in 2022 while the most sighted herbivore remained the dik dik with 1,607 counts of observation compared to 1,349 in 2022.



Graph03: Other wildlife observations © Marwell

Water

The scouts continue to collect the data on water locations (Map 09) and types with an aim of establishing a map of the wet and dry water sources. The majority of the recordings were of water holes and water troughs. Compared with 2022 data one can see some trends on the repetition of locations which helps with ascertaining accuracy.



Map 09: Water sources and types recorded in 2023 © Marwell

SMART development and updates

The Kenya team has been using SMART 6.3 since July 2021. Aside from regular updates through the SMART Partnership some data issues with SMART and changes to the data model including addition of categories and metadata and the recruitment of two new scouts from Olturot and Kisima, it was necessary to have a SMART refresher and training. It was a two-day exercise led by Sakimba. Joshua and Stephen were also trained on how to collect data using SMART (Pic.14)



Pic.13: Lady scouts during SMART training



Pic.14 Getting to grips with SMART © Marwell

Community meetings & Scout barazas (meetings)

The most recent baraza, a quarterly meeting of all our scouts, took place in Civicon in Gatap in August.



Pictures 15: Scouts arriving for baraza in Civicon © Marwell

The scouts were accompanied by their respective community elder representatives (Pic.15), and they all shared progress on their community situations. They also reported any issues and potential solutions such as:

- So far this year, all areas apart from Kisima are experiencing hot and dry weather conditions. Despite this, the northern parts have enough pastures all around. The livestock have however moved to the satellite camps as pastures near the places of residence are not as lush as in the wild.
- Since the beginning of the year, several areas have reported insecurity with cases of livestock thefts and banditry. We were very glad to learn in August that areas that are normally hotspots for these vices, like Lkotikal area, are now calm and safe.



Pics 16 & 17: Sakimba opening baraza & scouts listening © Marwell

- Poaching
 - Arge area reported of random shootings believed to be carried out by so-called warrior-herders in the satellite camps who shoot antelopes for game meat. This area is currently without any personnel as Milgis Trust withdrew one of their scouts when the borehole there was destroyed.
 - Mpang scouts also reported black ostriches killed for its feathers that seem to be gaining in popularity. The poachers were traced and warned by the community members to cease their detrimental activities, and they promised to do so.
- ➔ We have now put two outreach scouts into place to engage with the morans (warriors) to reduce poaching. These morans are juvenile herders and when they leave home for satellite camps with their livestock they poach wildlife for meat but also for target practise. Lmalmalwa Lekenit, formerly our hay monitor, and Lmalarin Lengewathe, our Lkotikal scout, have been engaged in their new roles. In a first meeting with the warriors, they discussed that Grevy's zebra are of major conservation concern and that any poaching is bad not only for the wildlife but also the communities who are all supporting conservation. The morans were very happy to learn about Grevy's zebra conservation as they had no idea of their importance. Already they have promised not to shoot them anymore and even to report any incidents of injuries or other difficulties, so that the animals can be helped.
- Human-wildlife conflict (HWC): Most areas reported of wild predators preying on their animals. Hyenas, leopards and lions seem to be the main culprits, although jackals are said to be killing goat kids and lambs in Anderi area.
 - ➔ To keep better track of HWC incidents we have incorporated this in the SMART model. This allows the scouts to report livestock deaths caused by predation and for us to provide written records rather than just hear-say.
- Water shortage for wild animals at night: in several areas, communities have started to fence off their water troughs and even water pans from wildlife at night to preserve the little water they have for their livestock. Due to a lot of cloudy weather solar pumps are not fully functional and in another area pipe work is broken and unreliable. We are supporting these communities with fuel for pumps and pipe repairs so that they will once again open the water for wildlife at night.

The scouts are getting updates and corrections on their data collection at every baraza. All together they then plan on improvements and how to potentially reallocate patrol areas for better data.

The baraza at the end of 2023 had to be cancelled as flooding made roads too treacherous, and so the scouts were given their annual awards for 2023 only in June 2024. Those best in patrolling, best in camera trapping and best equipment handling, totalling ten scouts, were given cash rewards. The scouts had asked for this in place of goats or equipment items which we handed out previously.

Veterinary support & Anti-poaching efforts

Again and again our scouts report injured Grevy's zebra to Enrita, so she can call a vet and KWS. Some animals are genuinely injured, others have been poached.

Following the pandemic and the drought, we are still seeing increased incidents of poaching and report all of those to KWS who then follow them up and talk to the communities as well.

We had several cases of injured or dead animals when either a KWS vet or a GZT vet attended to the animal with varying degrees of success:

- At the end of August, a stallion was found with a spear wound, bleeding heavily and in great pain. It was difficult to get a vet out, so two scouts stayed with the animal for its safety and provided hay and water. The vet did eventually attend but the animal succumbed to the pain and blood loss.

- In January this year, one of the scouts in Meibae came across the desperate situation where a day-old foal was trying to suckle from its dead mother (Pic.18). Luckily, the KWS Northern Kenya vet unit came right away and took the foal to the Reteti Animal Rescue Centre. They confirmed that the female Grevy had died from post-partum complications. We know from a recent update that the foal is doing well which is a relief after the tragic start in life.



Pic 18 & 19: Scout protecting foal until KWS unit arrives Marwell scout attending to injured stallion © Marwell

- In March a call from our scout in Kisima reported a female ensnared by barbed wire around her neck (Pics. 20 & 21). A vet came from Westgate together with the GZT team who helped with darting and the snare was successfully removed.



Pic.20 & 21: Dr Sharon Mulindi of the KWS North Kenya Vet Unit removing the snare from the Grevy's zebra © Marwell

- June saw another lactating female injured. This time a vet was able to help and get the female back on its legs, saving the life of the Grevy female and its foal.
- The case of an injured stallion in July did not have such a good outcome. He was found with a very serious injury on his hind hoof and was so weak that he allowed our scout to touch him while drinking from a bowl of water (Pic.19). As no vet was available that day, our scout, together with one from the Milgis Trust, stayed overnight with the animal to protect him from hyenas. While the KWS vet unit did attend the following day and tried to treat the Grevy, he did die the following day as his injuries were too severe.

Conservation Outreach

School Outreach

After a small break due to Enrita's reduced travelling schedule due to pregnancy, Stephen (see People and Capacity Building below) picked up the school outreach and held his first session at Sidai Primary School in Loltepes which is new in our outreach programme. The session included 78 students with both boys and girls of grade 1 and 2, so quite young.

During the session, students interacted with animal toy models to understand various characteristics and differences among species (Pics.22 & 23). For example, they learned to identify different physical features of Grevy's zebra and common zebra, such as stripes, body size, and shapes. This hands-on approach allowed them to grasp concepts like biodiversity and species identification in a fun and engaging manner.



Pictures 22 & 23: Stephen and students using toy models of wildlife © Marwell

Following the more formal session, the school embarked on a tree planting initiative (Pics 24 & 25) which served as a practical educational tool, fostering a deeper appreciation for nature and environmental conservation among the school community. The trees were bought from South Horr by the Marwell team. Students, teacher and cooks enthusiastically participated in this activity symbolizing a collective commitment to sustainability and ecological stewardship. A variety of five tree species were carefully selected and strategically planted across designated areas of the school grounds. Stephen and one of the teachers also discussed the creation of a school wildlife club as an opportunity to instil a sense of environmental responsibility and conservation ethics among the student body, fostering a generation of conscientious stewards of our planet's biodiversity. We have seen the success of such wildlife clubs in several other schools already.



Pictures 24 & 25: planting trees at Sidai school © Marwell

Stephen further visited Keleswa Primary School and Hadad Primary School. On both visits, the sessions he taught were "Living Things around Us" which educates pupils about the diverse range of living

organisms in their environment, their roles, and the significance of biodiversity and “How Animals Work” which is all about understanding what makes animals move, eat, and stay alive. How they are similar to us but also how they differ. In Hadad school the Marwell team visited the school farm area where the children had planted trees during World Environment Day in 2023. Despite challenges with lack of water, the majority of tree whips have survived and grown under the children’s care (Pics.26 & 27).



Pics 26 & 27: young trees grown from whips since 2023 at Hadad Primary school © Marwell

Exposure Tours & Conservation Clubs

On 28th August, Stephen together with Joshua (see People and Capacity Building below) led the students and teachers of two primary schools to Lewa Wildlife Conservancy for a 3 -day trip. Twenty students (seven boys and 13 girls) and two teachers from Two Sisters Primary School, and 23 students (13 girls and 10 boys) and two teachers from Hadad Primary School were involved. The trip aimed to enhance the students' understanding of wildlife conservation, the importance of environmental stewardship, and the role of protected areas like Lewa Conservancy in safeguarding endangered species.



Pictures 28 - 31: school children at Lewa learning to use binoculars © Marwell

During the game drive, the group had the opportunity to observe a wide variety of wildlife. Each time they encountered an animal, bird, or significant natural feature, the bus would stop, and Mr. Ephantus, Lewa's Educator, would provide detailed explanations.

The group was fortunate to spot both black and white rhinos, along with lions and buffaloes, elephants, a variety of antelopes, and, of course, Grevy's zebra, making the experience even more memorable (Pics.28,29,32,33). Although capturing clear photographs was challenging, the sight of these majestic animals left a lasting impression on the students, and they were thrilled to encounter three of the Africa Big Five on this incredible adventure.



Pics 32 & 33: buffalo, elephants and Grevy's zebra encounters during game drive © Marwell

The Lewa trip included a visit to the conservancy's farm, where students were introduced to various plant species, sustainable agricultural practices and recycling techniques at the Lewa Conservancy. The students were taught the importance of waste management, specifically how organic waste can be transformed into rich fertilizer through composting (Pics.34 & 35).



Pics.34-36: Ephantus teaching use of plants in sustainable farming and conservation © Marwell

Students were instructed on various methods of recycling water to maximize its efficiency in agricultural practices. Practical uses for plastic bags and tins were demonstrated, such as repurposing them for planting seedling (Pic.36). The students learned about setting up and maintaining nursery beds for growing seedlings.

The students' visit to Lewa Conservancy was a rewarding experience that gave them a better understanding of wildlife and conservation. They saw the beauty of nature up close and learned about the efforts to protect endangered animals. The trip also helped them understand the importance of preserving

the environment. The students left with valuable lessons and a deeper commitment to caring for our planet. Letters of appreciation from the schools were sent to Enrita and Stephen afterwards expressing how much they valued and enjoyed the trip.

Lchekutis / Herders Outreach

The herders (children who look after their families' livestock and cannot attend regular school sessions) were high on the outreach agenda this year to make up for the last few years (pandemic and drought) where they could not attend any sessions at all.

So far, we held sessions in Mpang and in Civicon. An exposure tour, similar to that of the school children, is also planned before the year is over.

The outreach assistant together with the field assistants and the warriors-outreach-scouts participated in the herders' outreach activity in Civicon, Gatap area. The young boys and girls were lively and demonstrated good understanding of the wild animals in their area. They amazed Stephen and Joshua by how quickly they could point out differences between the Grevy's and the plain zebras by observing the animals' toy models. Unlike the school pupils, these children have field experience as they spend all their days outside with their goats and sheep.

Community Outreach

In June, the community outreach programme in Mpang focused on raising awareness about wildlife protection and environmental conservation. By focusing on the endangered Grevy's zebra the initiative not only highlighted a critical conservation issue but also aimed to foster a sense of responsibility and action within the community. Sakimba and Joshua utilized engaging video clips (Pics.37 & 38) to effectively communicate key messages and promote community involvement in conservation efforts.



Pic.37: Mpang Community watching wildlife videos © Marwell



Pic. 38: Herders and other children watching wildlife movies with the community in Mpang © Marwell

People and capacity building

Outreach Assistant



Enrita, our Field coordinator, went on maternity leave in May, so has been, and will be for some time, unable to travel and continue with her outreach work in schools as well as with herders. She was very concerned about this interruption, especially for the herders who had already missed out on education, first during the pandemic, and then during the prolonged drought period. We therefore decided to engage a temporary outreach assistant, Stephen Letrok (Pic.39). He impressed with his background in environmental management and community engagement as well as the fact that he speaks not only English and Swahili but also Samburu, something much needed when working with herders. Stephen took over from Enrita just before she went on maternity leave and will also be carrying on for quite a while when she is back as she still won't be in a position to travel in the field. Stephen has already excelled in his first few school visits and has delivered a much-applauded first exposure trip with schools this summer.

Pic 39: Stephen Letrok, Outreach Assistant © Marwell

Field Assistant

One of our funders, Drusillas Park in the UK, is very generously providing a bursary for one Kenyan student to complete a master's degree. We have decided to offer this amazing opportunity to our hardworking field assistant, Sakimba Lesoloyia. He is very excited to further his education and has chosen a two-year course towards a Master of Science in Environmental Governance at the Faculty of Science and Technology at the University of Nairobi. He will begin this autumn and spend his second year carrying out his research phase in the field, back in the NKGZP area.



Pic.40: Joshua Lolkireri, Field Assistant © Marwell

To cover Sakimba's field duties in the meantime, and to support Enrita, we have taken on another young man as field assistant, Joshua Mwanga Lolkireri (Pic.40). He has a BSc in Wildlife Management and Conservation and has been working with Sakimba since May to get to know our communities and all the things this role requires. So far, he has shown to be very capable and with Enrita's support he should be just fine.

New scout recruitment

Following communications with the Olturot area chief and community elders, they sent three candidates to Sakimba during August, so he could interview them for the position of scout. The interview aimed to gauge basic literacy, basic numeracy, smartphone handling, conservation awareness, availability and problem-solving approaches. While all three men had potential, Sakimba settled on Banayo Learamo since he could write his name, numbers, was comfortable handling a smartphone and had exceptional skills on resolving conflict situations within his community. He also expressed that he is very outspoken on matters regarding conservation and his community.

Scouts' Literacy Training

Once again, we held the annual training sessions with focus on counting. For most of our scouts, counting with numbers is not part of their culture. Using the SMART phones and recording sightings, however, requires a certain understanding of numbers and a level of literacy. The scouts are learning and Lizbeth has been able to change some of the reporting modules to account for better numeracy. This will make our data more precise. As before, the teacher tried to make the lessons fun using dance and physical exercise when learning to count. The scouts very much enjoy these sessions and learn in a playful way.

The exercise was a two-day activity in Civicon in August in combination with the quarterly baraza. The scouts and their trainer, Mr. Joseph Lenaula, were all set and happy about the arrangements. Four individuals were new to the exercise; the newly recruited Olturot scout, Kisima scout, and the two warrior-outreach-scouts. Fortunately, three of them were at the same level of literacy with the scouts and only the Lkotikal area warrior-outreach-scout had some catching up to do.



Pictures 50-53: numeracy training in Civicon with exercise, studying and marking © Marwell

Female scouts were more dedicated as most of them would sit during break time and keep on writing numbers up to 70-80. There was notable progress by the scouts, and they demonstrated increasing confidence and competence in both literacy and numeracy.

They were taught on the alphabet and syllables on the first day and numeracy on the second day. They were even given a test on numeracy to fill in gaps between 1-20 and they did exceptionally well.

The trainer noted several challenges that slow down the learning activity such as; the long time span between formal training events and the need for extra materials for learning. He volunteered to be teaching the seven scouts who live closer to him during weekends. We are also trying to organise training three times a year but it is difficult to keep all scouts away from home for several days at a time.

Collaboration and partnerships

In May this year, Lizbeth attended the launch of Grevy's zebra Trust's Strategic Plan and Leadership Transition Blessing Ceremony to represent Marwell. GZT has a new CEO and this traditional Kenyan ceremony was meant to celebrate and bless the outgoing CEO, Belinda Low Mackey, and the incoming one, Peter Lalampaa, together with all their partners and communities. We have worked with Peter since the beginning of GZT in 2006 and are confident that our relationship with GZT will further grow in closeness and strength.

Lizbeth further has had several working meetings with David Kimiti, Director of Research and Impact at GZT regarding the GGR results, collaring data and review of the national Grevy's zebra strategy.

In July this year, Marwell's Director of Conservation, Dr Phil Riordan, visited various partners in Kenya to strengthen existing collaborations and plan for new ones. Aside from better links with the University of Nairobi, the main focus was on GZT. Lizbeth and Phil had a meeting with Peter Lalampaa, the new CEO of GZT, and David Kimiti. The agenda was to discuss ways in which we can strengthen the collaboration and friendship between GZT and Marwell. The various discussions led to ways we can further collaborate and will form the basis for a long-overdue Memorandum of Understanding (MoU).

The Status of Grevy's Zebra (*Equus grevyi*)

Wild Population

The most recent assessment of a national survey in Kenya found approximately 2,800 individuals in January 2018 (Rubenstein et al., 2018) and it was estimated that 230 individuals might be left in Ethiopia.

The Grevy's zebra has been assessed in 2016 by the IUCN as Endangered A2acd ver 3.1 (Rubenstein, Low Mackey et al. 2016).

International Studbook

The total number of Grevy's zebra in zoological organisations was 176.307.0 (483) in 120 institutions in 24 countries on 31st December 2023 (Langenhorst, 2024). The European *Ex situ* Programme (EEP) and the Species Survival Programme in North America manage the majority of these animals, while Japan coordinates a studbook for eight institutions. Together, these populations provide a genetically and demographically healthy back up to their wild counterparts. For more details see the international studbook here <https://www.marwell.org.uk/wp-content/uploads/2024/04/2023-Grevys-zebra-ISB-1.pdf>

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Please also read the funding proposal (Appendix B) which provides more details on our plans.



The photos in this report have been compressed for distribution by email. If you require higher resolution images, please contact Tanya on TanyaL@marwell.org.uk.

Our Grevy's zebra conservation colleagues and partners

Marwell Wildlife works closely with Kenyan conservation partners with whom it develops joint conservation programmes. Our key partners – listed alphabetically – are described briefly below:

Grevy's Zebra Technical Committee (GZTC)

The Grevy's Zebra Technical Committee is a steering committee with a mandate from KWS to evaluate implications of technical recommendations for Grevy conservation before implementation, develop intervention protocols, set monitoring standards and procedures, and evaluate their implementation and effectiveness, reviewing all Grevy's zebra conservation, management and research proposals.

The GZTC is a collaboration of organisations all committed to conserving Grevy's zebra, including: Grevy's Zebra Trust (GZT), Lewa Wildlife Conservancy, Marwell Wildlife, University of Princeton (PU), Northern Rangelands Trust (NRT), Kenya Wildlife Service (KWS), and Wildlife Training and Research Institute (WRTI).

Grevy's Zebra Trust (GZT) www.grevyszebratrust.org

The Grevy's Zebra Trust (GZT) has been established to address the urgent need to conserve Grevy's zebra in the community rangelands of Ethiopia and Kenya. GZT has become an integral part of the GZTC.

Kenya Wildlife Service (KWS) www.kws.org

The KWS is the country's statutory wildlife body and is ultimately responsible for the conservation of Grevy's zebra. In partnership with KWS, Marwell Wildlife and the EEP have contributed significantly to the development and execution of the national Grevy's Zebra Conservation Strategy.

Lewa Wildlife Conservancy (Lewa or LWC) www.lewa.org

The Lewa Wildlife Conservancy holds some 20 percent of the world's remaining free-ranging Grevy's zebra and hosts a dynamic research programme. Marwell continues to support Grevy's zebra monitoring and research within Lewa, and many of the projects planned by the GZTC will be carried out in collaboration with the Lewa Research Department (LRD).

Milgis Trust www.milgistrust.com

The Milgis Trust is a non-profit organisation founded by wildlife conservationist and safari guide Helen Douglas-Dufresne and her partner Peter Ilesley to sustain the wildlife, habitat and the pastoral peoples' way of life in northern Kenya.

In January 2010 the Trust approached Marwell with a request to establish wildlife monitoring within the Milgis ecosystem and has since become a close partner in our NKGZP.

Northern Rangelands Trust (NRT) www.nrt-kenya.org

NRT supports the development of community conservancies. Marwell has partnered with NRT to implement a programme of training and capacity building to strengthen wildlife management within all member-community conservancies. In addition, it has co-developed a system for wildlife and vegetation monitoring which is being introduced to a selection of conservancies.

University of Princeton (PU) www.princeton.edu/~equids/people.html

University of Princeton have collaborated on a number of Grevy's zebra conservation activities, most notably the Great Grevy's Rally and analysis of the photos collected during the survey. They are also heavily involved in the stripe ID project, which is hosted at Mpala Research Centre in Laikipia thanks to Princeton's close association there.

Wildlife Research and Training Institute (WRTI) www.wrti.go.ke

WRTI was delinked from KWS to address the need to provide coordinated wildlife research and comprehensive data to inform scientific based solutions that inform policy decisions, management approaches, and create innovative wildlife-based products and services in the wildlife sector.

B. Proposed Activities for 2024-2025

Monitoring of the highly vulnerable, small populations of Grevy's zebra in remote and under resourced areas continues. We have learned a lot from our data collection during the drought years, preparing ourselves for the next drought which is expected for 2025. The second area we are focussing on is the conservation education of children but also warriors and communities. You can read more on that under point 2.

We are strengthening our cooperation with the Grevy's Zebra Trust with a Memorandum of Understanding (MoU) to work more closely on technologies, training and research as well as support and actions for communities. Our areas of work complement each other allowing conservation action for Grevy's zebra across their entire Kenyan range.

The support we receive from the EEP and the wider EAZA community is critical to these efforts, and we hope that you will continue with us in this important conservation work for the beautiful Grevy's zebra.

Northern Kenya Grevy's Zebra Project

1. Grevy's zebra monitoring & SMART technology

Our 24 scouts (6 women and 18 men) continue their monitoring of Grevy's zebra and other wildlife through daily foot patrols on which they collect data using GPS enabled phones and an extensive network of camera traps. Our SMART database allows us to record and analyse a wide variety of parameters which help us to understand the movement & behaviour of Grevy's zebra in the landscape as well as other wildlife. Since two of our scouts are now working with morans (see point 2) we would like to recruit two more to back fill the gaps.

The old Access-based stripe ID database is still being used to identify number of individual Grevy's zebra in areas previously not monitored before we decide if new scouts are needed in those areas. Our field assistant has completed recording a backlog of pictures for the database that were taken during the drought years at feeding sites. He is now aiming to reduce the back log of photos that started to accumulate when our data analyst left. Our partners, GZT and Lewa, are also still using the database, as our Extract/Compare software is currently still the only one all partners can access and contribute to.

Conservation Impact

Both the Stripe ID database and the SMART data are cost-effective means of monitoring movement, distribution and abundance, and behaviour of Grevy's zebra, other wildlife, threats and the performance of individual teams. Our field assistants provide fast and invaluable feedback to the scouts on their data gathering and performance. Our Database Manager analyses all data for ongoing management as well as timely response to any emergency situation.

1. Grevy's zebra Monitoring & SMART technology	£
Food & transport to cover travel to, from and within field sites (£ 660/month)	7,920
6 x full time scout @ £ 77/month, over 12 months	5,544
20 x community scouts (men and women) average £45/scout/month, over 12 months	10,829
<i>Equipment</i>	
12 x replacement camera traps @ £ 185	840
5 x new phones @ £ 180	900
<i>SMART Connect/Mobile maintenance:</i>	
12 x server fees @ £57/mth	684
12x 13 databundles @ £8/mth	1,248
	27,965

2. Peace and Conservation Education in Northern Kenya

Following the pandemic and drought years, we have revived community relations and ramped up our outreach programme. Providing the next generation with Conservation Education is high on the agenda but also in light of increased poaching incidents since the extreme drought. Our scouts have a dual function as they serve as conservation and peace ambassadors in their own communities as well as between communities. Providing our scouts with access to learning, banking and bringing funds to the communities supports whole families and shows the communities the value of wildlife and its conservation. This in turn increases their cooperation with us as well as KWS for the benefit of wildlife. This and next year we are hoping to target a larger audience through a large-scale campaign providing teaching and talks in local languages, in person and on radio around the Maralal area where knowledge on Grevy's zebra and conservation is minimal compared to other regions.

The conservation education work covers teaching school children and sessions for pre-school children, 'herders' (children not in school); Our team has recognised that a large amount of poaching is carried out by morans (warriors), a group of young men who have to leave their home and find their own way in life. They often team up with other warriors and together they live off the land and prepare their own food. During this phase they are quite disconnected from their communities, excluded from meetings, education and awareness raising we try to provide. It has become clear that this group hunts wildlife, including Grevy's zebra for food but also just for target practise and fun. We therefore have dedicated two of our scouts to work with the morans to educate them on Grevy's zebra conservation and their importance for their community. To increase on this effort, we would like to provide the warriors with exposure tours similar to those of schools and herders, so they get to see conservation action first hand and learn about species and habitat protection as well as environmental management. Initial meetings have shown that the morans are very interested and want to learn more. We will try to connect with GZT for this as they already run a thriving programme for their morans. They are the future leaders of their communities, and it is therefore crucial for long-term conservation efforts to get them on board.

Building on the success of exposure tours over the last three years, we are sponsoring several more schools, groups of herders and even selected members of the communities we work with to attend one-to five-day trips to wildlife conservancies as many of them have never left their home area and seen the wildlife their communities share the landscape with. We have found that these experiences raise the children's awareness and enthusiasm for wildlife conservation. Many of them initiating conservation clubs and environmental activities when they return to their homes.

Conservation Impact

Through community engagement we have already sensitized a large and remote population of pastoral people to the relevance of conservation and the importance of wildlife to their health and welfare. Improved social security and an understanding of the role of wildlife and environment provide clear grounds for coexistence of regional communities. This in turn secures habitat and resources that wildlife and people depend on for survival. We now would like to target those groups that are crucial to our work but for some reason have escaped our attention. Exposure of children and warriors to wildlife and its conservation will bring along the conservators of the future.

A very wide audience can be reached and exposed to our work with relatively little money.

2.Peace and Conservation Education in Northern Kenya	£
Community meeting (men & women) once a quarter @ KES 10,000	240
Outreach for schools/herder @ KES 10,000/quarter	240
Baraza (scouts, elders & community members @ KES 151,000/quarter	3,520
	4,000
<i>Large scale community awareness raising X 2</i>	
vehicle fuel Marwell & KWS trucks @ KES 80,000	470
refreshment & snacks for community ~ 100 people @ KES 80,000	470
advertising on local radio stations, 2 days @ KES 16,400	97
credit to mobilize community members @ KES 4,000	24
	1,061
<i>Equipment for outreach sessions</i>	
Camera/video camera	350
Speakers for Projector	90
	440
<i>Wildlife exposure trip for select community members</i>	
Food/goats @ KES 62,000	365
Cook/camp assistant @ KES 10,000	60
transportation return trip @ 120,000	710
Game drive vehicle @30,000	180
water provision @ 10,000	60
Contingency 10%	140
	1,515
<i>Herders kids Camp (40 children for 5 days)</i>	
Food @ KES 20,000	120
Transportation cost @ KES 120,000	700
Branded kangas @ KES 60,000	350
Contingency 10%	120
	1,290
<i>Wildlife Exposure trip Morans (20 from different stations)</i>	
Transport @ KES 120,000	700
Food @ KES 50,000	300
water provision @ 10,000	60
Games drive vehicle @ KES 20,000	120
Contingency 10%	120
	1,300
<i>Wildlife exposure schools (3 days, 2x schools)</i>	
Bus hire @ KES 120,000	700
Food @ KES 65,000	380
Accommodation dormitories @ KES 9,000	60
Game drive cost @ KES 8,000	50
Teacher stipends @ KES 4,000	25
Contingency 10%	120
	1,335
Total	10,941

3. Healthy Rangelands

Loss of habitat, especially erosion and lack of grazing, is one of the major threats to Grevy's zebra. The land is dry, the soil compacted, and the majority of any rainfall runs off the land, causing flooding rather than being retained in the ground. Communities are cutting down trees for firewood, exacerbating these conditions. Last year we joined in with the World Environment Day by planting trees at Hadad Primary school. Since then, we have been planting some trees in all our outreach locations. We are encouraging the communities to renature their often-depleted environment as well as teaching them not to cut down trees but to conserve and nurture them for future generations. The schools are a good starting point for this as the children learn about the importance of trees in the ecosystem and take on responsibility for looking after the world around them.

Following one school visit, one of the elders suggested that we roll out tree planting every time we hold a baraza in a community. We therefore would like to spend one extra day with the community following each quarterly baraza to plant 100 seedlings, a mix of neem, acacia and croton species. An officer from the Kenya Forest Service (KFS) will train community members on the importance of trees and how to plant and nurture them. The communities will then select some members (morans od women) to take over the responsibility for these seedlings.

The KFS Officer will also investigate which sites might be suitable for a tree nursery that can then supply seedlings for more communities. We will use SMART phones to geo reference all the planting sites for our mapping, then collect data on species planted and periodically monitor survival and growth rate by measuring the length of the trees as they grow. All this to show the outcome and impact of planting the trees.

Conservation impact

Over time the communities will grow more and more trees, helping nature's recovery for the benefit of people and wildlife alike. At the same time children will grow up learning and understanding the importance of trees and how to look after them for future generations. Once the tree nurseries are established, this scheme should become independent and managed by those who live with and benefit from it.

3. Healthy Rangelands	
<i>Tree planting (in 4 communities)</i>	
400 seedlings @ KES 20,000	120
KFS Officer @ KES 15,000/quarter	350
Equipment @ KES 10,000	60
Contingency 10%	53
Total	583

For further planned activities please see the next page

National Strategy Fulfilment / GZTC Activities

4. Strategy review

The Recovery and Action Plan for Grevy's zebra (*Equus grevyi*) in Kenya (2017-2026) has nearly run its course. This plan, the third document of its kind, has guided and monitored all Grevy's zebra conservation activities since it was first produced in 2007. It is due for another review and update. KWS will convene a meeting of stakeholders to review the current version and produce the fourth edition. We are expecting a meeting over several days including conservation NGOs (like Northern Rangelands Trust, Lewa Wildlife Conservancy, GZT, Marwell Wildlife, Samburu Trust), community conservancies, research institutions and community representatives from Laikipia, Wamba and El Barta and others to discuss what has been achieved, is still outstanding and what will the next strategy aim for. As members of the GZTC we are not only sending our entire Kenyan team but would also like to support with materials and funds to enable participation from all stakeholders.

4. Strategy Review	£
Transport to review location @ KES 20,000	120
Accommodation Kenya team @ KES 30,000	180
Food @ KES 27,000	160
Meeting contribution (room hire/printing/catering attendees/...)	700
Total	1,160

People and Capacity Building

5. Literacy and Numeracy Learning for the Scouts

Since summer 2022 we have provided two annual formal sessions for literacy and numeracy by hiring a primary school teacher. The teacher has identified that the long time between sessions is making it hard for the scouts to remember what they have learned and this slows down progress considerably. We would therefore like to provide a third session hoping to increase learning steeply. All the scouts are very engaged and complete their "homework" between formal sessions to practise their new skills but they do require more attention from the teacher. He is visiting those scouts that live relatively nearby in between sessions but that is not possible for all of them. Driving this development not only helps with data collection and quality but does improve the day-to-day life of our scouts. It makes them far more independent people, encourages further learning and allows them to care for their families better in an increasingly modernising world.

5. Literacy/numeracy learning scouts	£
3 x Pre-school teacher stipend @ KES 13,000 each	230
3 x Food for the scouts & teacher over 5 days @ KES 45,000 each	795
3X Teaching and Learning materials during sessions @ KES 25,000 each	440
Total	1,465

6. Solar panels

Our scouts have to recharge their phones frequently to keep them operating. Due to their remote locations, access to charging sources has always been a challenge. Several teams currently have portable solar chargers to allow charging in the field. However, these chargers take a long time and often have technical issues. In some communities we have installed large solar panels on either a communal building or the house of an elder where they can be used not only by our scouts but by others as well. This has bought us a lot of goodwill in the communities. In two particularly remote areas, Keleswa and Mpang, as well as in Maralal where our field assistant lives and does most of his data work, we would now like to install the more robust larger panels to provide the scouts and FA with a more reliable source of energy, making sure they can complete data collection more regularly. Having the panels on the house of elders, ensures that they are guarded, and access is given fairly to those who need it.

Conservation Impact

Better access to charge their phones will enable the scouts to carry out their patrols more regularly providing better quality data. Allowing the communities to benefit from the solar panels when not in use by the scouts improves their daily life and makes them appreciate wildlife and their habitat more as they derive direct benefits from working with us and the scouts.

Providing the field assistant with a more reliable source of electricity will allow him to sort, manage and transfer large sets of data without the very frequent interruptions through power cuts in his area which are currently slowing him down considerably. More timely data delivery to our data manager in Nairobi allows faster analysis and response times to resulting outcomes.

6. Solar Panel Installation three communities	£
3 x Big solar panel(80watts) @ KES 30,000	180
3 x Inverter @ KES 60,000	360
3 X Batteries @ KES 30,000	180
Installation accessories and labour for solar panel @KES 36,000	200
	920

For a summary of the funding proposal see the next pages

Summary of funding proposal Grevy's zebra conservation 2024/25

Northern Kenya Grevy's Zebra Project

1. Grevy's zebra Monitoring & SMART technology		£
Food & transport to cover travel to, from and within field sites (£ 660/month)		7,920
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20 x community scouts (men and women) average £45/scout/month, over 12 months		10,829
<i>Equipment</i>		
12 x replacement camera traps @ £ 185		840
5 x new phones @ £ 180		900
<i>SMART Connect/Mobile maintenance:</i>		
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12x 13 databundles @ £8/mth		1,248
		27,965
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Community meeting (men & women) once a quarter @ KES 10,000		240
Outreach for schools/herder @ KES 10,000/quarter		240
Baraza (scouts, elders & community members @ KES 151,000/quarter		3,520
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vehicle fuel Marwell & KWS trucks @ KES 80,000		470
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Transportation cost @ KES 120,000		700
Branded kangas @ KES 60,000		350
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		1,290

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Teacher stipends @ KES 4,000	25
Contingency 10%	120
	1,335
Total	10,941

3. Healthy Rangelands

<i>Tree planting (in 4 communities)</i>	
400 seedlings @ KES 20,000	120
KFS Officer @ KES 15,000/quarter	350
Equipment @ KES 10,000	60
Contingency 10%	53
Total	583

National Strategy Fulfilment / GZTC Activities

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Total	1,160	

People and Capacity Building

5. Literacy/numeracy learning scouts		£
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3 x Food for the scouts & teacher over 5 days @ KES 45,000 each	795	
3X Teaching and Learning materials during sessions @ KES 25,000 each	440	
Total	1,465	

Infrastructure

6. Solar Panel Installation three communities		£
3 x Big solar panel(80watts) @ KES 30,000	180	
3 x Inverter @ KES 60,000	360	
3 X Batteries @ KES 30,000	180	
Installation accessories and labour for solar panel @KES 36,000	200	
	920	

Overall Total	43,034
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