

THE GREAT GREVY'S RALLY

CITIZEN SCIENCE SCORES BIG IN SERVICE TO CONSERVATION OF THE ENDANGERED GREVY'S ZEBRA

More than 120 teams from the public joined together in January 2016 to take a big step in support of endangered species wildlife conservation. Joining with conservancy staff, county officials, scientists, and diplomats, citizen science teams took more than 40,000 digital photographs, majority of which captured Grevy's zebra throughout their range. Using Geographic Positioning and bar code technology, a scientific team was able to analyze all these photos (data) with significant accuracy. Since every zebra's pattern is unique, we now know with tremendous confidence how many Grevy's zebras there are, their age and sex, and their distribution in northern Kenya.

This effort is a great testimony to the collective efforts of Kenyan citizens and residents joining with the County Governments from Laikipia, Samburu, Marsabit, Isiolo and Meru to monitor an endangered wildlife population, and make a significant contribution to our understanding of its population dynamics. Without the cooperation of these territories, conservancy scouts, Grevy's ambassadors, livestock herders, and conservation organizations, such an in-depth census of this population would have taken so much longer and would have been so very expensive.

<http://www.greatgrevysrally.com/county-partners/>

In this exercise, participants gathered data and raised new questions about the status, health and future of the Grevy's zebras. We are all collaborators in this new scientific culture. Volunteers add value to the work and questions of scientists, AND they learn new skills, and add a deeper understanding of scientific work in a manner that is appealing. By being more engaged in conservation questions, we create a more open network and demonstrate the importance of public engagement in our conservation research and actions. This makes for a more "democratic" research and informed decision-making based on evidence that comes from our people.

THE NEED, METHODS, FINDINGS AND IMPLICATIONS

THE NEED.

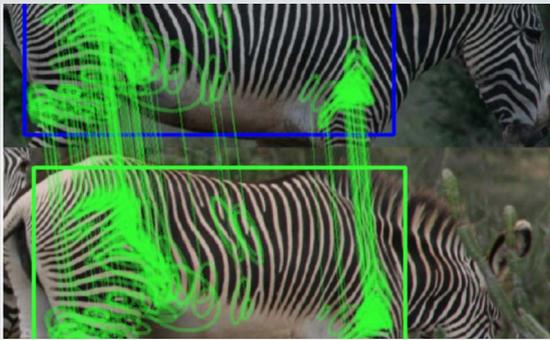
In the 1970s there were over 15,000 Grevy's zebras in Kenya. They were typically seen in Samburu, Isiolo and Marsabit counties and herds sometimes numbered into the thousands! By the late 1980s numbers had dropped to around 4,000 due to over-hunting for their beautiful skins. Despite a ban on the skin trade, they continued to decline due to hunting for subsistence meat and loss of habitat, and by the early 2000s only about 2,000 Grevy's were estimated to remain



The beautiful Grevy's zebra

Over 40,000 photographs were taken in total and the analysis concludes that Kenya's Grevy's zebra population is 2,250 individuals with 95% confidence intervals of ± 93 .

An additional 100 animals are estimated to occur in small areas outside of the Grevy's zebra's historical range and in areas that were too dangerous or inaccessible to survey during the census period **giving a national Grevy's zebra population estimate of 2,350 individuals.**



Zebra being identified by stripes

Counting Grevy's zebra has always posed a challenge. Historically, they have usually been counted from the air but detecting them can be problematic as they like to shade under trees in the heat of the day. To get a better estimate, the Kenya Wildlife Service's Grevy's zebra Technical Committee recommended carrying out a 'Sight-Resight' analysis by amassing a large number of volunteers to drive throughout the Grevy's zebra's range, taking pictures on two successive days and then using the newly developed IBEIS software to identify and match individual zebras based on their unique stripe patterns.

In this way the problem of past counts and censuses could be overcome yielding a more accurate estimate of population size both nationally and by counties and ecologically relevant regions. Critically, the health of Grevy's zebra populations can also be determined using this method, by providing age structure data. This method provides an important breakthrough for Grevy's zebra conservation.

THE METHODS.



Citizen Science in action

Performing the census required a herculean effort since Grevy's zebras range over 25,000 km². It was solved by involving the general public. The Grevy's zebra range was divided into 45 blocks and teams comprised of over 350 members of the public, conservancy members, rangers and scouts from conservancies and National Parks and Reserves as well as scientists spent two consecutive days between January 30 – 31 2016 driving around each block photographing as many Grevy's zebras facing right as possible. Importantly, each photograph included data on the date, time of day and geolocation.

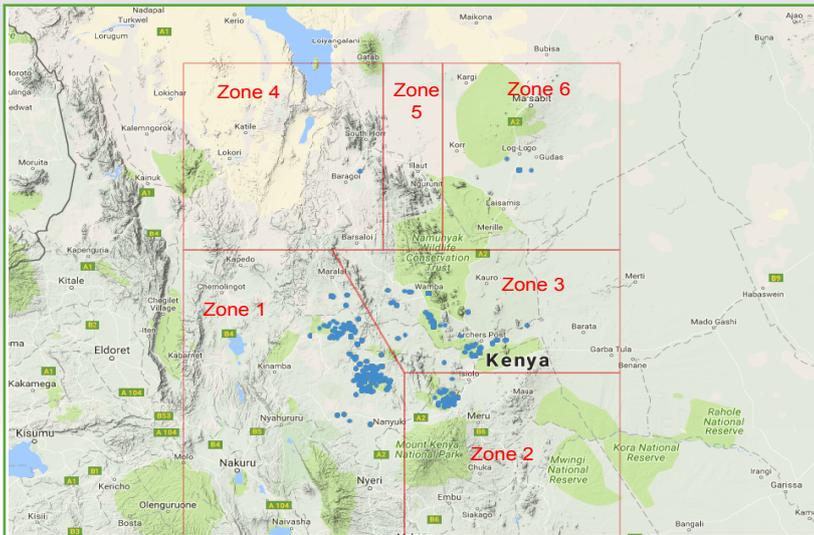
Being the first time that the IBEIS software has been tested on such a large dataset, it was done by experts in USA. In future these analyses can be done in Kenya. The photographs were sent to the US-based IBEIS team who processed the images, identifying unique individuals seen on days 1 and 2 as well as the number seen on day 1 that were re-sighted on day 2. From these three values population size estimates could be computed.



Map showing Grevy's zebra sightings by County during the Great Grevy's Rally

THE FINDINGS.

The population sizes and confidence intervals of individual counties and biological zones based on likely movement corridors are shown in the following figures. What is most interesting is that Laikipia county, once considered a refuge, is now home to the largest population of Grevy's zebras in the country. We also recognise that in Marsabit County and Samburu North, we did not have enough teams to be able to access the vast and remote areas that Grevy's zebra inhabit in these regions, and that these populations are likely somewhat larger than estimated.

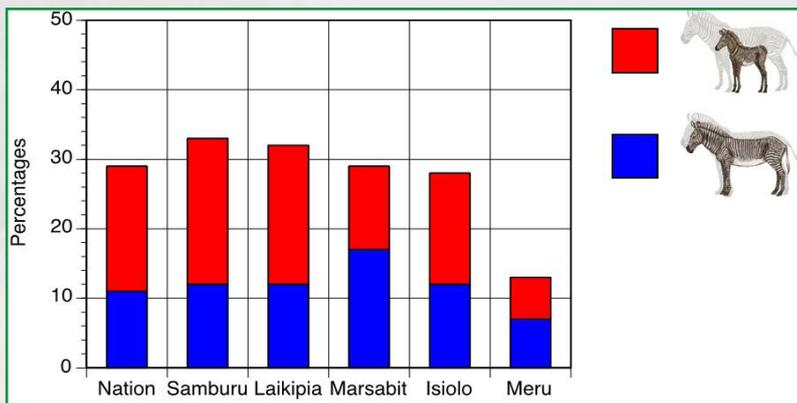


Map showing the density of photographs taken during the Great Grevy's Rally based on ecological zone

In addition, the demographic state of the national population and most counties is healthy. When the percentage of foals and juveniles approaches 30% of the total, populations are stable and sustaining themselves because there are sufficient recruits to replace adults that die. As the subsequent figure shows, only Meru county's Grevy's zebras do not approach this essential threshold whereas both Samburu and Laikipia counties surpass it

Laikipia county, once considered a refuge, is now home to the largest population of Grevy's zebras in the country.

CONSERVATION ACTIONS GOING FORWARD



Graph showing the percentage of Grevy's zebra foals (red) and juveniles (blue) by county

The results of the Great Grevy's Rally reinforce the critical importance of access to grazing and water within a secure environment for Grevy's zebra. Historically, Laikipia County was not a natural part of Grevy's zebra range, However, today it is supporting over half of Kenya's Grevy's zebra population due its healthy rangelands. This tells us that the Grevy's zebra is a sensitive and reliable indicator of ecosystem health.

ACTION: RESTORE GRASSLANDS

Loss of habitat due to overgrazing by livestock has long been recognised as the most critical threat facing the species, yet land degradation continues at an unprecedented rate. Although cattle migrate, most small stock (sheep and goats) stays locally resident throughout the year, continuously overgrazing plants, which has resulted in increasing bare ground and undesirable species like *Acacia reficiens*. The results of the Great Grevy's Rally are a clear reflection of this trend.



Degraded land

This underscores the critical need for the grazing of all livestock types to be planned for throughout the year to ensure recovery time for plants. Where this has been achieved, there are significant results to show for it.

Scaling up sound rangeland management practices to restore grassland will enable Kenya's Grevy's zebra population to increase, whilst also having benefits for multiple wildlife species and community livelihoods.



Before rangeland healing



After rangeland healing

ACTION: IMPROVE WATER ACCESS

Limited access to water during the dry season is another major threat to Grevy's zebra, especially in water-scarce regions. Developing wildlife-dedicated points at existing or planned water sources, ensures the needs of Grevy's zebra and other wildlife can be met, and reduces the potential for disease transmission between wild and domestic species.

This partnership demonstrates the power of science in developing effective conservation policies.



Grevy's zebras congregate at a water pan in Laisamis, northern Kenya

ACTION: DEVELOP WILDLIFE-FRIENDLY INFRASTRUCTURE

As Kenya moves towards securing much-needed development for its economy and its citizens, we call upon County Governments in Grevy's zebra range to ensure that wildlife needs are duly considered to ensure the continued protection of the country's natural heritage. There are many global examples of progressive wildlife-friendly infrastructure developments that serve both conservation and development goals. Let Kenya lead the way for Africa in this regard.

ACTION: ADDRESS HIGH LION PREDATION RATES IN MERU COUNTY

Often, species of high conservation value come into conflict. In some Grevy's zebra locations lion predation is extremely high and needs to be addressed. Lewa Wildlife Conservancy is in partnership with Kenya Wildlife Service to pilot options to reduce the reproduction of lions using chemicals. This partnership demonstrates the power of science in developing effective conservation policies.

ACTION: DEVELOP LOCAL CAPACITY AND SUPPORT CITIZEN SCIENCE MONITORING

In order to achieve the above actions, local capacity must be built, and monitoring Grevy's zebra using citizen scientists must be continued so that we can assess the impact of conservation interventions over time.



GGR Citizen Science team and GZT scout collecting data



STAY TUNED FOR THE DATE OF THE NEXT GREAT GREVY'S RALLY!

This Citizen Science Effort was made possible with the support of the following organizations.

