

# Seven-Year Legacy: Special Report Samburu Wildlife and Communities



**Dr. Samuel Andanje, Kenya Wildlife Service, Kenya**

**Dr. Paul K. Muoria, African Wildlife Foundation, Kenya**

**Dr. Callistus K.P.O. Ogol, Kenyatta University, Kenya**

**Dr. Nicholas O. Oguge, Earthwatch Kenya Trust, Kenya**

## Overview

The Samburu district is a vast, arid region of Kenya covering roughly 21,000 square kilometers—which is about the size of Wales, Israel, or New Jersey. It is home to a wide range of savannah wildlife, from the large predatory big cats to the herbivorous antelopes and the Grevy's zebra (*Equus grevyi*). Sharing this rugged backdrop is a growing population of Samburu people who have raised livestock and lived off the land here for hundreds of years.

Samburu's wildlife habitat is increasingly threatened by the overgrazing of livestock, and conversion of grassland to farmland. Conflict arises when wildlife destroy crops, or prey on livestock. There is also competition between wildlife and livestock for watering holes during dry seasons.

Since 2003, Earthwatch has worked to promote the conservation and well-being of wildlife, wild habitats, and human populations in the Samburu region—specifically, the West Gate Conservancy, Meibae Conservancy, and the Samburu and Buffalo Springs National Reserves. In collaboration with around 30 local partners, Earthwatch developed a suite of projects to address these issues, working closely with the Samburu communities, whose knowledge of local resources is a crucial asset in effective conservation and future sustainability.

The research objectives are:

- To survey the population ecology and habitat use of Grevy's zebra

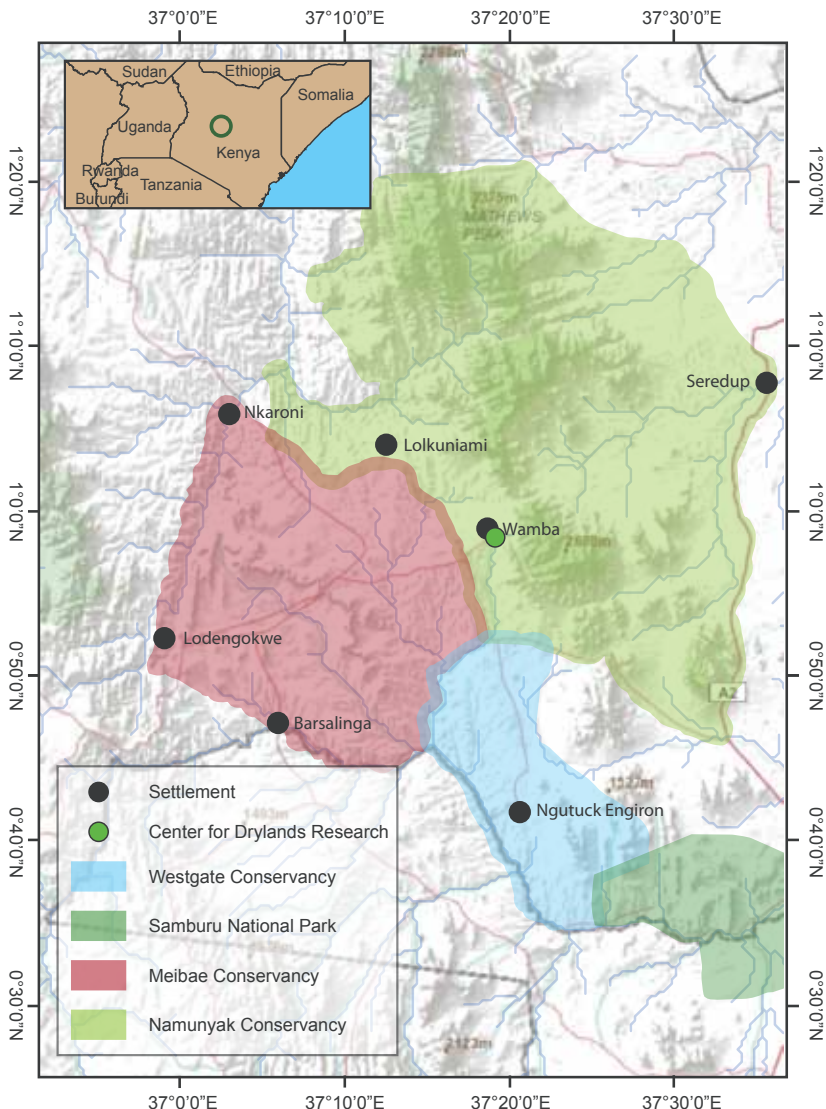


Figure 1: Earthwatch teams work, or have worked, in several parks and conservancies in the Samburu region. The research center is located in Wamba, and other surrounding communities also engage in the program.

- To record the activities of large predators, from African wild dog (*Lycaon pictus*) to lion (*Panthera leo*), to minimize conflict with communities
- To determine the uses and efficacy of traditional herbal medicines to support the sustainable use of these resources
- To document and map water resources to assure safe water for people and minimize conflict with wildlife

- To assess the quality of wildlife habitat both within and outside protected areas

## Conserving Grevy's Zebra

The Grevy's zebra population has undergone a 50% decline over the past 18 years, leaving the total population remaining in the wild to be about 2,500 individuals. Their range is now reduced to Kenya and Ethiopia—it once included Somalia. The species has been classified as *Endangered* (IUCN Red List) since 1986. From 2003, Dr. Nicholas Oguge,

Dr. Paul Muoria and teams of volunteers have monitored Grevy's zebra in pastoral lands where threats include habitat degradation, competition for resources with an expanding human and livestock population, disease outbreaks and predation by lions.

Grevy's zebra are currently receiving significant attention at a national level. The Kenya Wildlife Service (KWS)—the government agency responsible for wildlife conservation in the country—launched a national strategy to help coordinate the conservation of the species. All Earthwatch scientists on this project contributed to the strategy and were appointed to sit on the National Grevy's Zebra Technical Committee to help KWS implement it. This implementation is relying heavily on data collected by Earthwatch volunteers.

Over the project's lifetime, the researchers have gathered population size, status, and distribution data of Grevy's zebra in the Wamba area, as well as from Samburu and Buffalo Spring National Reserves (see map). This baseline information is essential for successful management and conservation of the species.

As the Grevy's zebra stripe pattern is unique for each individual, photographs of the flank are taken to build a database of identified individuals. This is used to assess zebra survival, based on sightings and re-sightings, and to investigate movements and habitat use. This close monitoring also provides an opportunity to assess the health of individual zebras, and consequently, the threat of disease outbreaks.

In 2009, the Wamba area experienced a severe drought, during the peak of which many Grevy's zebra were observed in Samburu National Reserve. For example, 361 and 412 individuals were counted in the Reserve in June and July, respectively. This is higher than previous years when most of the Grevy's zebra have been found in community areas rather than protected areas. Many Grevy's zebra were also encountered in Buffalo Springs during the dry season. These findings indicate that the Samburu and Buffalo Springs National Reserves and West Gate Conservancy are

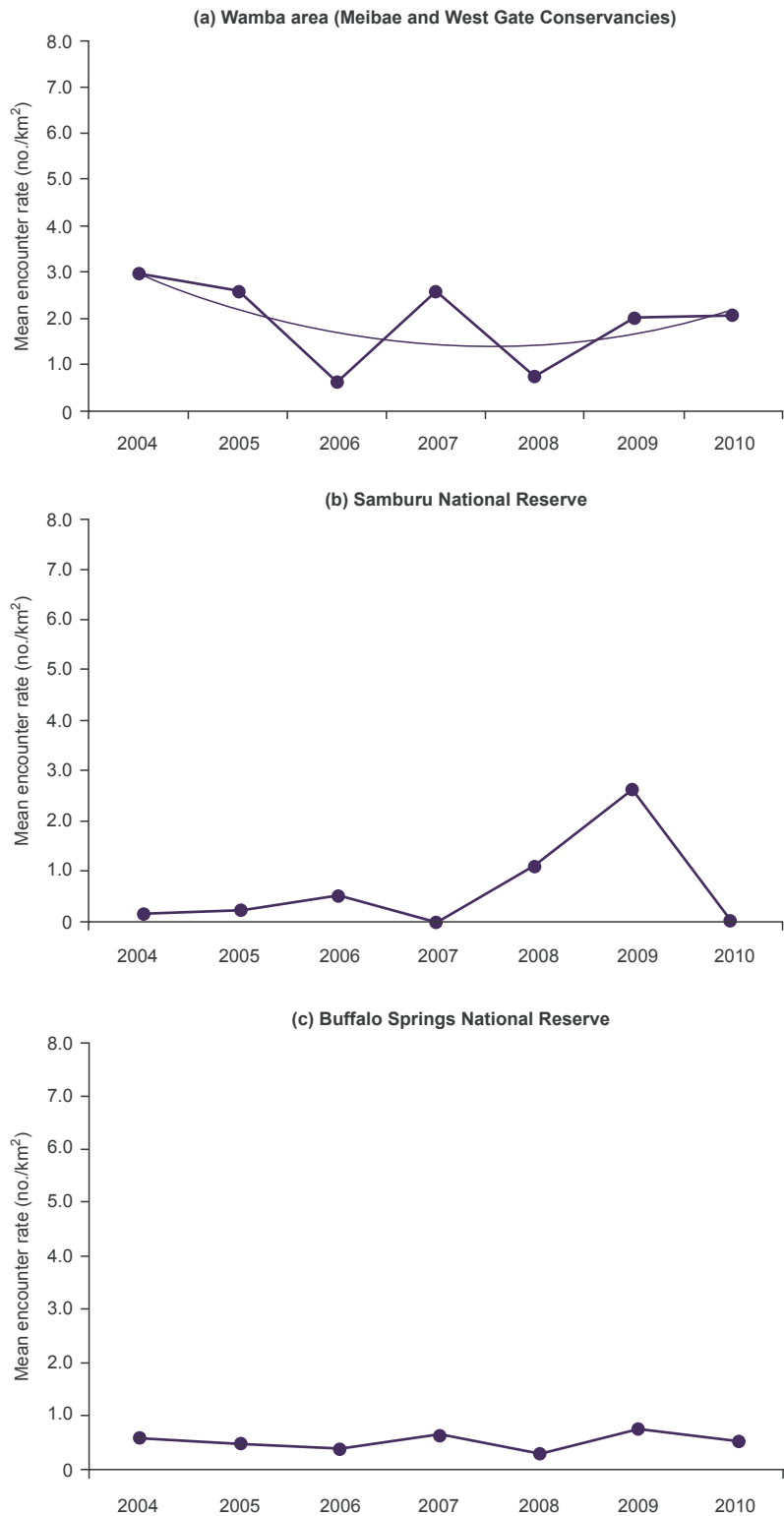


Figure 2: Figures showing the relative abundance of Grevy's zebra in Wamba area, Samburu and Buffalo Springs National Reserves from 2004 to 2010.

important dry season refuges for the species.

Although habitat destruction contributes greatly to the declining numbers of Grevy's zebra, parasites that cause diseases in zebra and can reduce their reproductive success are also a potential threat to the species' survival. Since June 2010, Earthwatch researchers have

worked with a local graduate student to investigate the influence of age and gender on the gastrointestinal parasite loads in Grevy's zebra. The aim is to determine which demographic groups within the zebra population are most susceptible. So far, about 200 fecal samples have been collected and will be analyzed this year.



Figure 3: Camera traps enabled researchers on *Carnivores in Conflict* to determine where carnivores reside in the Samburu region. The species monitored favor locations with shade and cover, such as caves.

## *Studies helped to indicate which predators were the bigger threat to domestic livestock.*

### Carnivores in Conflict

As competition for food and habitat degradation has led to a decrease in herbivore numbers in the Samburu region, predators are turning to domestic livestock for food, causing retaliation from local communities.

Fielding from 2006 to 2008, this Earthwatch project, led by Dr. Samuel Andanje, aimed to better understand the ecology of these large predators and to improve livestock herding practices among local communities, while minimizing conflict and aiding the conservation of Kenya's endangered and vulnerable predators.

To measure carnivore distribution and abundance, at the close of 2007, the team mapped out 65 carnivore den sites in the study area, took GPS coordinates and recorded the following data: the type of carnivore residing at each site, the approximate number of carnivores present, and the type of any bones observed.

Results indicated that carnivores had almost no space to roam freely among community areas. Very few tracts of bushed areas remained where carnivores could freely roam and hunt at any time of the day without coming into contact

with humans. The heavily degraded vegetation also denied them cover and shade. Carnivores therefore hid in caves, tree thickets, and burrows on mountain ranges and raised ridges.

To analyze the prey diet of predators, at the end of 2008 the team collected and analyzed a total of 85 scat samples, including 71 hyaena, eight lion, 18 leopard and two wild dog scats. They analyzed hair samples from the scat to determine prey species.

Identified prey included both domestic animals, including cow, sheep, goat, donkey and camel, as well as wild animals, including Grant's gazelle, plains zebra, Grevy's zebra, impala, waterbuck, dikdik, eland, lesser kudu, baboon and oryx.

The study showed that the hyaena had the highest domestic kills followed by the lion and wild dog. The leopard had the least domestic kills. On the other hand, the lion and the leopard had the highest wildlife kills, followed closely by the hyaena, while the wild dog recorded the least kills. This information helped to indicate which predators were the bigger threat to domestic livestock, and therefore local livelihoods.

### Medicinal Plants

The Samburu people have long used plants for medicinal purposes. Maintaining this traditional knowledge is a crucial part of their cultural heritage – and scientists are interested in trying to prove the treatments scientifically. By building a database documenting how the resources are used, Earthwatch can help local resource managers ensure that the medicinal plants are used sustainably.

Since this project's initiation in 2006, volunteers led by Dr. Callistus Ogol and Dr. Paul Okemo have used questionnaires to help collect indigenous knowledge on traditional medicinal plant use and conservation among Samburu communities. From each of the medical practitioners interviewed, specific information has been gathered on the diseases and conditions treated by each plant, along with parts of the plant used, and how the plant is harvested. The interviews have also investigated if there is any control on the harvesting process, where the plants used to be found, where they are found now, and their relative availability.

The surveys indicated that the Samburu people use medicinal plants to manage conditions including stomach problems (such as diarrhea), de-worming, coughs, malaria, wounds, oral thrush, skin diseases, yellow fever, polio, eye problems, and expulsion of placenta. In 2008, when plant samples were extracted and tested against micro-organisms known to cause the diseases named above, they were found to be effective on the organisms causing malaria, typhoid, wound infection, and even the one affiliated with cystic fibrosis.

Testing in 2010 also found four plant species to show strong activity against bacteria that cause diarrhea and tuberculosis, explaining their local use against bacteria-associated diseases such as stomach aches. Scientists believe these antibacterial responses are due to the presence of active plant chemicals, such as tannins, which are known defensive compounds that counteract plant infection by bacteria and fungi. The specific names of the plants known to be effective on the organisms causing each

disease have not been disclosed in order to protect community resources.

Through the questionnaire, researchers also found that parts harvested from the majority of the plants were roots or root bark, stem bark, whole plants, leaves, and plant sap. They found that harvesting methods were unregulated, destructive and non-sustainable. The team also learned that medicinal practitioners were beginning to travel further afield to find plants that had been readily available in the local area just a few years prior. In 2010, the teams evaluated a total of 171 transects comprising some 855 quadrats for abundance of medicinal plants (quadrats are square sampling units commonly used in ecology studies). The data on their distribution and abundance is being analyzed to help inform conservation efforts, future monitoring activities, and restoration initiatives.

The Earthwatch researchers recommended that destructive practice be prevented through education, and by initiating projects to replace the destroyed

plants. They also suggested boosting the plant population by introducing seedlings of the valuable plants, which could also help the community economically.

Interviews also revealed how plant traders got into the business, how they obtain their stock, how often they restock, and how many customers they have every day, week or month. The traders explained limitations to their businesses, how they determine doses of the concoctions, and prices. The information collected through this questionnaire will help to determine the level of threat to each plant species, and to inform sustainable harvesting practices and stimulate cost-effective conservation measures.

### Community Well-Being

Donations from Earthwatch and individuals helped build a new classroom for Samburu schoolchildren in 2008. Previously, the “classroom” was a small patch fenced by thorns. Classes were cancelled during the rainy season, and teaching aids were prone

to vandalism. Since the facility has improved, more community members have been encouraged to send their children to the school.

In addition, with funding from Tyco International Ltd. in 2009, Earthwatch reconstructed the Samburu region’s Silango Nasham Nkainito dam, providing clean water for 700 homes. A major source of water for humans, livestock and wildlife in the Samburu district, dams are often poorly constructed and rarely maintained. Earthwatch scientists have also found that water from shallow wells and dams in the Wamba area of the Samburu district are highly contaminated, posing a serious threat to public health.

In collaboration with the community, the team de-silted the dam, installed piping and a water filtration chamber, and built bathing blocks. The dam now provides clean water for both humans and livestock, filtering contaminated water and improving its quality. In addition to reducing child mortality rates, the dam can also mitigate human-wildlife conflict; the water used for livestock during the day is available for wildlife at night.

### Four plant species showed strong activity against bacteria that cause diarrhea and tuberculosis.



Figure 4: In regions where medicinal plants are found, Earthwatch volunteers help determine the relative abundance of the species.

#### Recent Publications

Boru, H. (2009). Spatial-temporal distribution, habitat quality and human interaction of Grevy’s zebra in Northern Laikipia District. Master of Science Thesis, University of Nairobi

Lelenguyah, G.L., Ogol, C. and Muoria, P.K. (2009). Historical distribution and threats to Grevy’s zebra (*Equus grevyi*) in Samburu - An indigenous people perspective. Accepted for publication by *African Journal of Ecology*

Mariita R., Ogol, C., Oguge, N. and Okemo, P. (2011). Methanol Extract of Three Medicinal Plants from Samburu in Northern Kenya Show Significant Antimycobacterial, Antibacterial and Antifungal Properties. *Research Journal of Medicinal Plants* **5(1)**: 54-64

Omwenga, E., Okemo, P., Mbugua, P. and Ogol, C. (2009). Ethnobotanical Survey and Antimicrobial Evaluation of Medicinal Plants used by the Samburu Community (Kenya) for treatment of Diarrhoea. *Pharmacognosy Magazine* **4(18)**: 165-176