



FIELD REPORT

Marketing title:

Samburu Communities and Wildlife: Grevy's Zebras

PI name:

Dr. Paul Kimata Muoria

Research site/ region:

Samburu Landscape, Kenya

Country:

Kenya

Research site latitude/ longitude:

0.980 N, 37.33 0 E

Protected area status:

Community owned land and National Reserves

11 Feb 2010

Period covered by this report:

From 1 Jan 2009 to 31 Dec 2009

Report completed by:

Dr. Paul Kimata Muoria

Dear volunteer,

Greetings from Wamba! On behalf of the Grevy's zebra research team, I would like to sincerely thank you for your continued interest and support to the project. Thanks to your participation, the project was able to achieve a lot despite the harsh global economic times and a severe drought on the local scene. Since 2003, we have been monitoring the Grevy's zebra population size and status and threats to their survival in the Samburu Landscape. Your participation in our project in 2009 provided continuity in this long-term monitoring. We managed to conduct monthly censuses of Grevy's zebra in the Wamba area, Samburu and Buffalo Springs National Reserves during the months of March, May, June, July and November 2009. We also photographed and archived the digital images of most of the Grevy's zebra we counted. These images are being used to monitor survival of foals and their mothers as well as to monitor movements and changes in numbers. Competition for water, food and space between Grevy's zebra and livestock is believed to contribute towards the sustained population decline of this endangered equid.

When you walked the line transects counting Grevy's zebra, other wild animals and livestock, you helped collect data to enable us estimate the densities of these animals on community areas. This will provide us with important baseline information as we continue monitoring changes in the density of Grevy's zebra and its competitors. You also helped collect data to determine the impact other animals on Grevy's zebra behaviour. The conservation of Grevy's zebra is currently receiving a lot of attention at the national level. Kenya Wildlife Service, the government agency responsible for wildlife conservation in the country launched a national strategy to help coordinate the conservation of this species. All the Earthwatch scientists on our project were appointed to sit on the National Grevy's zebra Technical Committee to help KWS implement the strategy. This facilitates the use of the data you helped collect in the implementation of the national Grevy's zebra conservation strategy.

I hope you enjoyed working with us both on community areas and in Samburu and Buffalo Springs National Reserves. Just remember, Wamba is your home and you, your family and friends are always welcome. For those of you who have never been to Wamba and the greater Grevy's zebra "world", you might not want to leave. Come and enjoy the unique Wamba experience - the "unpolluted" Samburu culture, diverse wildlife interacting with the nomadic Samburu people and their livestock, scenic hills and friendly hosts. A visit to Samburu and Buffalo Springs National Reserve is always unforgettable - what with numerous elephants, reticulated giraffes, diverse antelope species and birds. So, come help us save the Grevy's and the other experiences will be free!



Dr. Paul K. Muoria
Principal Investigator
Grevy's Zebra Project
11 February 2010

SECTION ONE

Top highlight - the most significant, exciting or innovative result or story from this field season

Most of the field season was characterized by a severe drought which only ended in October 2009. Eighty two (82) Grevy's zebra succumbed to disease and drought related complications.

Non-technical overview of results

In 2009, we conducted total counts for Grevy's zebra (*Equus grevyi*) in the Wamba area (Ngutuk Ongironi Group Ranch – also known as West Gate Conservancy, Barasalinga and Ngaroni) and also in Samburu and Buffalo Springs National Reserves. We also photographed most of the Grevy's zebra individuals counted. These photographs are being used to enrich our database of known individuals. This database will be useful in monitoring changes in population size, movements, survival and other population parameters.

During the year, the Samburu landscape was experiencing a very severe drought which ended in October 2009. Most of the water resources, particularly in community areas had dried up and food availability was very low. Our data show that during the drought, most of the Grevy's zebra had aggregated in Samburu and Buffalo Springs National Reserves and a swampy area in Ngutuk-Ongironi Group Ranch (West Gate Conservancy). This area is an important dry season refuge for this species and habitat protection measures need to be taken. In 2008, we also counted Grevy's zebras, other wild animals and livestock along three to five kilometres transects in Wamba area. The resulting information was used to calculate the baseline density estimates which us provides us an opportunity to monitor changes in Grevy's zebra, other wild animal and livestock densities in the area. Preliminary results indicate that livestock species (goats, sheep, donkeys, camels and cattle) were more ambulant than wild animal species. In the coming years, we will continue monitoring seasonal and annual changes in densities of Grevy's zebra, other wild animals and livestock.

During the 2009 year, we also collected data to determine Grevy's zebra, other wild animals and livestock abundance in Wamba area using line transects. Livestock species were encountered more frequently than wild animals. Goats and sheep were the livestock species encountered most. The most abundant wild animals sighted along the transects were Grevy's zebra, Gerenuks (*Litocranius walleri*), Somali ostriches (*Struthio camelus molybdophanes*), Dik diks (*Madoqua sp.*), Grant's Gazelles (*Nanger granti*) and plains zebra (*Equus quagga*). Our findings suggest that total count and line transect methods can produce similar results. Outside of Earthwatch volunteer participation, we continued working with partners to monitor Grevy's zebra mortalities within the landscape. The cumulative number of deaths reported from January to October 2009 was 82 individuals. Thirty nine (39) of the deaths were reported in Wamba area, 7 in Samburu and Buffalo Springs National Reserves. Most of the deaths were attributed to drought while a few were caused by babesiosis – a tick-borne disease. We facilitated disease surveillance training of community scouts so that they can aid in reporting disease outbreaks and taking samples of wild animal carcasses they encounter in the field.

Acknowledgements

This work is co-funded by Earthwatch Institute and African Wildlife Foundation (AWF). We are grateful to the two organizations and their supporters for their continued commitment to our work and on Grevy's zebra conservation. We also recognize the contribution made by many Earthwatch volunteers who have been very supportive of our work over the years. The management of Ngutuk Ongironi Group Ranch (West Gate conservancy), Meibei Conservancy (Ngaroni and Barsalinga research areas), Samburu and Buffalo Springs National Reserves also continue to be very supportive of our work. They also provided field guides whenever

requested. Finally, we wish to thank the Government of Kenya for issuing a research permit for this project.

SECTION TWO: TECHNICAL RESULTS

1. RESEARCH OBJECTIVES

Objective 1

Monitoring Grevy's zebra population size, structure and distribution

Progress toward/against Objective

Data on the population size, status and spatial and temporal distribution of Grevy's zebras is necessary for effective management and conservation of this endangered species. To achieve this objective, we continued gathering population size, status and distribution data in the Wamba area (Ngutuk Ongironi, Ngaroni and Barsalinga) and also from Samburu and Buffalo Spring National Reserves (Figure 1). Two methods were used: attempted total counts and line transects.

Method 1

Attempted total count method: Data on the areas utilized by Grevy's zebras in Wamba area (Ngutuk Ongitroni Group Ranch - also known as West Gate Conservancy; Ngaroni and Barasalinga) and the reserves is available (Muoria 2004, 2005; Muoria unpublished data). We used the already designed census routes which cover the potential areas used by Grevy's zebra in each study site to search for Grevy's zebra. The surveys were conducted in March, May, June, July, and November, 2009 from slow moving vehicles. For each group of Grevy's zebras encountered, the following was recorded: their position using Global Positioning System (GPS), number and group composition, habitat, and other large grazers within 400m from the Grevy's zebras (Muoria et al., 2005). Data obtained was used to (i) estimate the minimum population size, (ii) population structure, and (iii) distribution of Grevy's zebras in the area. Each Grevy's zebra counted was photographed using digital cameras. Since Grevy's zebras stripe pattern is unique for each individual (Ginsberg, 1988), the photographs were used in enriching our database of identified individuals and as a way of avoiding double counting. This database will be used to calculate survival (using sight-resight techniques), investigate movements and habitat use. This close monitoring also gives us an opportunity to monitor the health of Grevy's zebras and therefore the threat of disease outbreaks.



Plate 1: Grevy's zebra (*Equus grevyi*). Copyright (Paul Muoria)

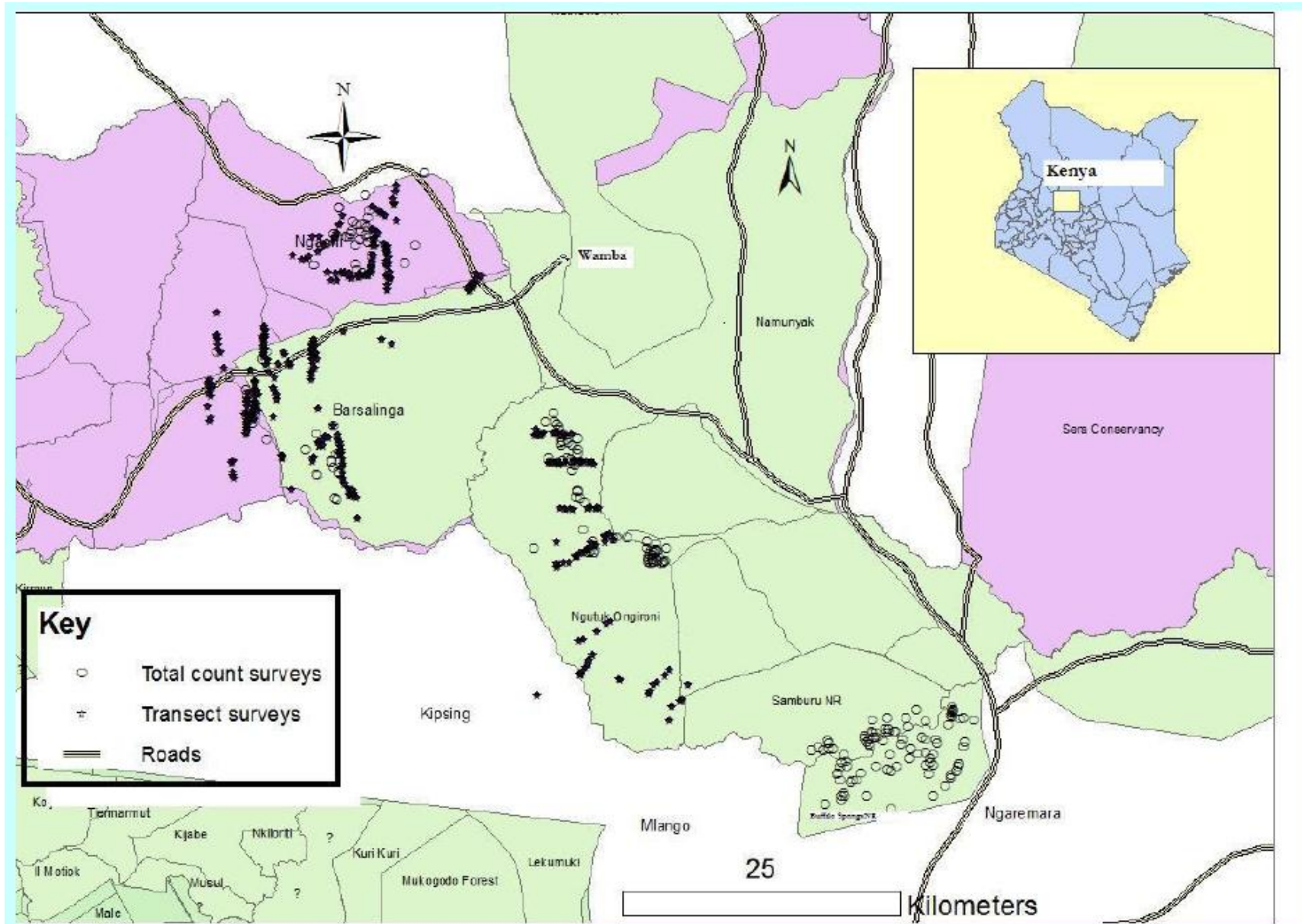


Figure 1: Study area

Key Results

Figure 2 shows the number Grevy's zebra per census in each of the areas during the surveys of 2009. Figure 3 shows the rainfall pattern in Wamba area during the year. The area was experiencing a severe drought that ended in October 2009. The figure shows that many Grevy's zebra were encountered in Samburu National Reserve during the peak of the drought. For example, 361 and 412 individuals were counted in the reserve in June and July, respectively. This is unlike the previous years when most of the Grevy's zebra utilized the community areas. Between 200 to 300 Grevy's zebra had also aggregated in Loijuk area of Ngutuk Ongironi Group Ranch (West Gate Conservancy). Many Grevy's zebra were also encountered in Buffalo Springs during the dry season. It is therefore clear that the Samburu and Buffalo Springs National Reserves and West Gate Conservancy are important dry season refuges for this species.

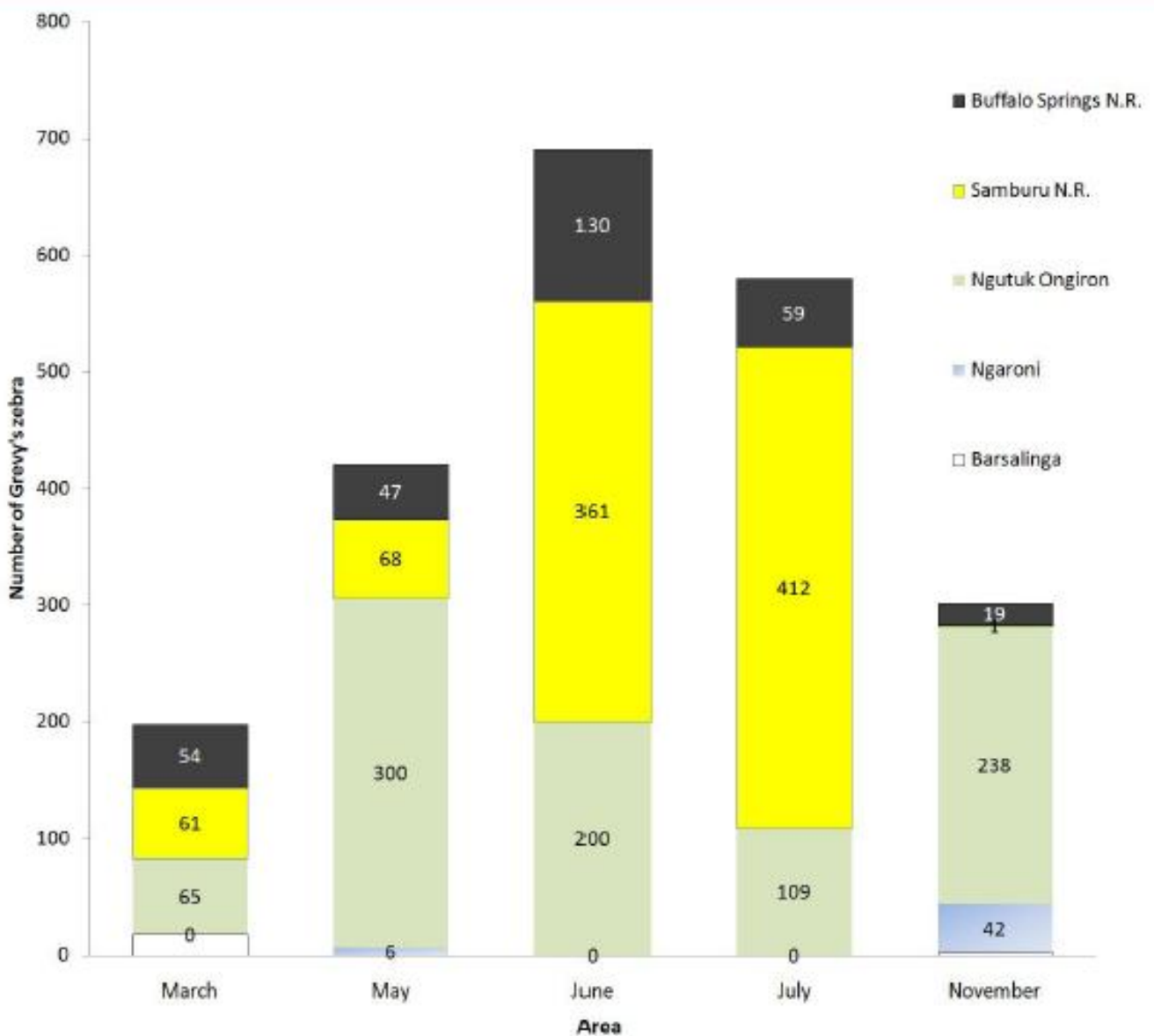
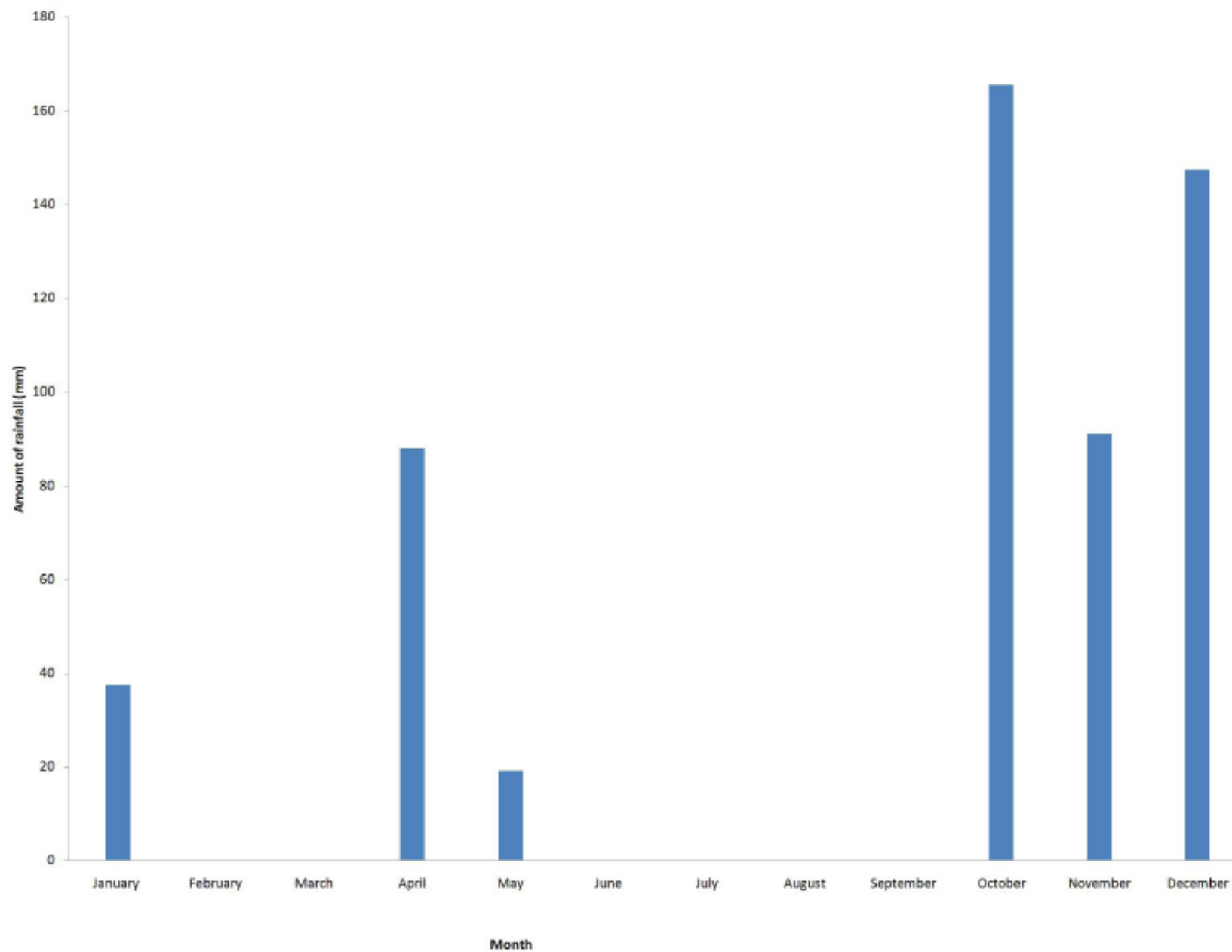


Figure 2: Total number of Grevy's zebra counted in the different study sites during 2009 surveys

Figure 3:
2009 total
monthly
Rainfall at
Wamba
Research
camp



Method 2

Line transect method: In May 2008 eighteen (18) line transects were laid in Wamba areas as described in Buckland et al. (2001). Another ten line transects were added in August 2008. Each transect was 3 to 5 km long. At least two observers walked slowly along each transect counting all wild herbivores and livestock observed. The locations of the start and the end of each transect were stored in GPS units and all observers were trained in using GPS units to navigate along the transect. On observing any of the target animal species, the sighting distance (Buckland et al., 2001) was measured using laser range finders (or estimated if no ranger finder was available) and their bearing from the observer measured using a pair of compasses or a GPS unit. These transects were surveyed in May, June, July and November 2009. During the reporting period, only 34 groups were sighted during the transect surveys in Ngaroni, Ngutuk Ongironi Group Ranch and Barsalinga Research areas during the surveys of May, June, July and November 2009. Twenty-five (25) of the sightings were sighted during the wet season census of November 2009 while the rest were sighted during the dry months. Due to low sample sizes during the dry season, dry season censuses data were not analyzed. We pooled all Grevy's zebra sightings for line transect surveys conducted in 2008 and 2009 to boost sample size and be able to estimate the detection function ($f(0)$) using Distance 5.0 software (Thomas et al., 2005). This translated into an effort of 568 km or 146 independent survey samples in which a total of 56 groups of Grevy's zebra were sighted. Figure 1 shows how the detection probability changed with distance from the transect centre-line. The probability detection function ($f(0)$) was 0.049 (CI =0.004 to 0.058). We assumed that the probability of detecting animals remained constant between areas and time. We then used the detection function to estimate density of Grevy's in the three research areas during the month of November 2009.

Results

Table 1 shows the animals which were observed during the transect surveys of May, June, July and November 2009 in community areas around Wamba. Livestock species were encountered more frequently than wild animals. Goats and sheep were the livestock species encountered most. The most abundant wild animals sighted along the transects were Grevy's zebra, Gerenuks, Somali ostriches, Dik diks, Grants gazelles and Plains zebra. Other wild animals sighted at lower intensities are listed in Table 1. During the month of November 2009, the estimated number of Grevy's zebra in Ngutuk Ongironi (West Gate Conservancy), Ngaroni, and Barsalinga area was 187, 44, and 72, respectively. During the "attempted total counts" of the same period, a total 236, 42 and 2 Grevy's zebra were counted in Ngutuk Ongironi (West Gate Conservancy), Ngaroni, and Barsalinga area, respectively (Figure 2). These results indicate that the two methods can lead to similar results at least for Ngutuk Ongironi Group Ranch (West Gate Conservancy) and Ngaroni research areas. Further analysis is being carried out and will be disseminated as a scientific publication planned for 2010.

Table 1: Animals encountered during 2009 transect surveys in Wamba community areas

Species	Total number counted	Number of groups	Mean Group size
Goats and sheep	8992	111	81.0
Cattle	406	18	22.6
Donkeys	364	49	7.5
Camel	233	44	5.3
Grevy's zebra	229	34	6.7
Gerenuk	182	64	2.8
Somali ostrich	170	42	4.0
Dik Dik	161	87	1.9
Grants gazelle	108	29	3.7
Plains zebra	88	12	7.3
Impala	41	2	20.5
Warthog	37	10	3.7
Baboon	36	2	18.0
Elephant	10	2	5.0
Bat eared fox	7	2	3.5
Hare	4	3	1.3
Lesser Kudu	4	2	2.0
Reticulated Giraffe	3	1	3.0
Jackal	3	1	3.0
Greater Kudu	2	1	2.0
Hyena	1	1	1.0

Objective 2

Determinants of spatial and temporal distribution of Grevy's zebras

Progress toward/against Objective

The influence of human settlements on Grevy's zebra distribution was investigated in 2007 and reported in 2008 (refer to 2008 field report for details). In 2009, we continued gathering data on Grevy's zebra numbers and distribution. In 2010, we plan to work closely with our GIS colleagues to investigate the role of vegetation types and topography.

Objective 3

Disease Surveillance for the conservation of Grevy's zebras

Progress toward/against Objective

During the year 2009, we continued working with partners to monitor Grevy's zebra mortalities within the heartland. The cumulative number of deaths reported from January to October 2009 was 82 (Source: AWF, GZT, NRT scouts, and KWS). Thirty nine (39) of the deaths were reported in Wamba area (West Gate Conservancy, Barsalinga and Ngaroni study sites) and 7 in Samburu and Buffalo Springs National Reserves. Grevy's zebra deaths reported in areas where we do not conduct intensive monitoring included 39 deaths in the Laisamis area and 3 reported in Kalama and Sera Conservancies. To facilitate rapid laboratory diagnosis, AWF worked with other partners to train community scouts on techniques to collect samples from

carcasses they encounter in the field. We are working with our partners to re-train the scouts in sample collection. Laboratory diagnosis attributed most of the deaths to babesiosis, a tick-borne disease, probably due to reduced immunity occasioned by the on-going drought. One sample from Laisamis (outside our study area) was diagnosed to be infected with anthrax.

Objective 4

The impact of climate change on Grevy's zebra conservation

Progress toward/against Objective

Objective has been postponed due to resources being unavailable. However since 2003, we have been collecting long-term daily rainfall and temperature data in three "weather stations" in Wamba area and one in Samburu National Reserve. We also have data that can be used to calculate Grevy's zebra and other wild animal and livestock density, distribution and movement patterns. Outside of Earthwatch support (and area of operation), we will be collaring 2 Grevy's zebras in February 2010 to monitor their habitat use more closely. We therefore have data, and we will continue to gather more data with which we can be used in climate change studies. In the coming year, we will seek appropriate collaborators to push our agenda ahead.

Objective 5

Indigenous knowledge on the past distribution and abundance of Grevy's zebras in Southern Samburu.

Progress toward/against Objective

Completed in 2007.

Our understanding of the abundance and distribution of Grevy's zebras is mainly based on studies carried out after the 1970s. We therefore lack published information on the status, distribution, abundance and threats that faced this endangered equid during most of the last century. However, much of this unpublished information is available from the local people who have over the years coexisted with these wild animals. We had proposed to tap into this unique indigenous knowledge to understand the historical abundance and distribution of this species. Specifically, we investigated whether there were disease outbreaks and/or droughts during which there were dramatic declines in Grevy's zebra numbers. In addition, we also investigated other historical causes of decline that the older members of the community knew. To accomplish this, a semi-structured and pre-tested questionnaire was administered in March 2007 in Wamba area (Ngaroni, Ngutuk Ongironi, and Barsalinga research area) from March 2007 to April 2007. The results of this study were published in 2007 as a Senior Undergraduate project report by Geoffrey Lelenguyah. We are currently preparing a publication for submission to a peer reviewed journal. This study showed that drought and diseases (i.e., anthrax and anaplasma) have historically been major threats to Grevy's zebra in the past. Anthrax outbreaks had taken place in 1949, 1952, 1957, 1963 and 1973 (Lelenguyah, 2007).

Key progress

In January 2010, we submitted a paper "Historical distribution and threats to Grevy's zebra (*Equus grevyi*) in Samburu- An indigenous people perspective" to African Journal of Ecology for publication.

Objective 6

Determining causes of suspected infant mortality and the behaviour of mares and foals.

Progress toward/against Objective

In 2007, we started monitoring the survival of 45 pairs of mares and their foals. We analysed photographs of Grevy's zebra taken during our regular censuses using computer software developed specifically for identification of Grevy's zebra using the unique stripe pattern (<http://www.conservationresearch.co.uk/zebra/zebra.htm>) in order to track each individual's survival. We have experienced technical problems with the software and we are working with the software developer to solve the problem. However, we have photographs of all individuals counted during our censuses and we will analyse them once the software becomes operational.

Objective 7

Diet overlap between Grevy's zebra and donkeys, sheep, goats and cattle in Samburu, Kenya.

Progress toward/against Objective

It is believed that competition between Grevy's zebra and livestock on community lands is the most serious threat faced by this endangered mammal. However, there is no data to show that there is actual diet overlap. In 2009, Mr. Mariciano Mutiga, MSc Student, Animal Ecology, Kenyatta University joined the project to examine diet overlap between Grevy's zebra, donkeys, cattle and sheep. The student has completed field work and is currently conducting micro-histological analysis at Kenyatta University laboratories. We expect that he will complete his analysis and thesis write-up by May 2010.



Plate 2: Volunteers collecting data on plant species fed on by Grevy's zebra. Copyright (Paul Muoria)

2. PARTNERSHIPS

- i. Local communities. Strong partnerships have been developed with the local communities specifically Ngutuk Ongironi Group Ranch (West Gate Conservancy), Ngaroni and Barsalinga communities of Wamba division. Through their interaction with researchers they have come to appreciate the importance of conservation, particularly of Grevy's zebras. They have also appreciated the fact that their area is crucial for the conservation of this endangered equid. In addition, they provide researchers with guides and information on Grevy's zebras. Their scouts are instrumental in disease surveillance and wildlife protection.
- ii. African Wildlife Foundation (AWF): African Wildlife Foundation has a strong presence in the Samburu landscape. It is with AWF support that this research project was initiated. In addition, AWF's Director of Conservation Science (Dr. Philip Muruthi) is involved in this project as the scientific advisor. Dr. Paul Muoria (author of this report) and Mr. Hassan Boru are full time employees of AWF. AWF continue to co-fund this project thus enabling us to continue with data collection between Earthwatch teams.
- iii. Government Departments: Due to the need to monitor zoonotic diseases, we have now formed close partnership with Kenya Wildlife Service, Livestock and Public Health departments. This is demonstrated by the recent anthrax outbreak in Wamba area when information was passed on to the three organizations by the project, and they were able to contain the problem before it could spread.

3. PROJECT DEVELOPMENT

N/A

4. DISSEMINATION

Printed

1. Diet overlap between Grevy's zebra and donkeys, sheep, goats and cattle in Samburu, Kenya. Masc Thesis, Kenyatta University. To be submitted Mariciano Mutiga, MSc Student, Animal Ecology, Kenyatta University.
2. Paul Muoria, 2009. Why the Research on Grevy's Zebra. in A NEWSLETTER FOR PARTNERS OF THE AFRICAN WILDLIFE FOUNDATION, May - August 2009; Pages 9 - 10.
3. Leleguyah, Muoria, Ogol (2010) "Historical distribution and threats to Grevy's zebra (*Equus grevyi*) in Samburu- An indigenous people perspective". Scientific manuscript submitted to African Journal of Ecology for publication.
4. Mulu, Kivai; Oguge, Nicholas; Muoria, Paul; Bekele, Afework (In Press) FEEDING ECOLOGY OF GREVY'S ZEBRA (*EQUUS GREVYI*, OUSTALET 1882) ON SAMBURU PASTORAL LANDS, KENYA. African Journal of Ecology
5. Hassan Boru, (2009) Spatial-temporal distribution, habitat quality and human interaction of Grevy's zebra in Northern Laikipia District. Master of Science Thesis, University of Nairobi
6. Paul Muoria & Philip Muruthi (January 2010) Grevy's zebra Project: 2009 annual report (submitted to Government of Kenya for permit renewal). African Wildlife Foundation, Nairobi

Digital

Rich databases for:

1. photographs of individual Grevy's zebra
2. census databases

Meetings and conferences:

1. Grevy's zebra research and conservation meeting held at KWS Headquarters On - 29th September 2009
2. Paul Muoria attended several meetings in his capacity as a member of THE NATIONAL GREVY'S ZEBRA TECHNICAL COMMITTEE.
3. Grevy's zebra Research team participated and made the following presentations
 - Estimation of Grevy's zebra density using Line transect sampling - Paul Mouria
 - Ecological interactions among humans, the endangered Grevy's zebra and livestock in Northern Laikipia District - Hassan Boru
 - Genetic structure of the endangered Grevy's zebra (*Equus grevyi*) in Kenya – Dr. Dennis O. Odhiambo (Msc student, University of Nairobi)
 - Diet overlap between Grevy's zebra, Donkeys, cattle and sheep - Mariciano Mutiga (Msc. Student, Kenyatta University).
4. Hassan Boru presented part of his findings at a conference in Cambridge University, UK.

5. CAPACITY DEVELOPMENT AND EDUCATION

1. Geoffrey Lelenguyah originally joined the project as an undergraduate student. After his undergraduate studies, he joined the project as a full-time research assistant. After working for one and half years on the project, he had assimilated enough skills which enabled him secure a job in the research section of the Ministry of Livestock Development, Government of Kenya.
2. Hassan Boru joined the project in 2005 (just after his undergraduate studies) as a research assistant. In 2007, he took study leave to pursue his Masters studies which he completed in two years and resumed duty with our project in July 2009. His Masters thesis focused on Grevy's zebra. Due to his hard work and leadership skills, he has been promoted to AWF's Kilimanjaro Heartland as a National Resource Manager.
3. We have been working with Mr. Mariciano Mutiga, MSc Student in Animal Ecology, Kenyatta University, to examine possible diet overlap between Grevy's zebra, donkeys, cattle and sheep. He has completed field work and is currently conducting micro-histological analysis at Kenyatta University labs. Mr. Mutiga is a High School Biology teacher and we believe that the research and conservation skills he is sharpening will be important in his teaching career and also to his students.
4. Teen Team (July 2009) and African Fellows Team (May 2009). We believe that by working with teenagers and early career scientists we are helping train future conservationists.
5. Community scouts. While conducting line transect surveys in Wamba area, we work with community scouts from Meibae conservancy (Ngaroni and Barsalinga research sites in our project description). We have trained the scouts in conducting line transect surveys and some of them are now able to conduct the work independently. Our long-term goal is to ensure that when the project ends, the community scouts can continue collecting the data therefore ensuring that monitoring is sustainable. In addition to volunteer time, we also used AWF resources and time to train some of the community scouts and rangers from Samburu National Reserve in disease monitoring and taking samples from carcasses they encounter in the field. This will ensure rapid disease diagnosis.

6.1 CONTRIBUTIONS TO INTERNATIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

1. Implementation of the National Grevy's Zebra Conservation Strategy. The author (Dr. Paul Muoria) and Dr. Nick Oguge sit on the National Grevy's Zebra Technical Committee. Paul Muoria is also a member Wamba Site Grevy's Zebra Management Committee while the project's scientific advisor (Dr. Philip Muruthi) is member of the National Grevy's Zebra Management committee. We are therefore strategically positioned to help implement the National Grevy's Zebra Conservation Strategy. We do this by sharing our data and experiences with members of the committees. At African Wildlife Foundation (where Paul Muoria and Philip Muruthi are employees), we have realigned our research and conservation activities to reflect and help implement this strategy.
2. Development of National Resource Management plans. During the last year, Buffalo Springs, Samburu and Shaba's National Reserves have been working with African Wildlife Foundation to develop a Joint General Management Plan (GMP). This project provided valuable information particularly on numbers, distribution, core habitats and resources, and movements of Grevy's zebra. Such information will ensure that Grevy's zebra core habitats will not be jeopardized as tourism and community development activities expand in this important tourist destination.

6.2 CONTRIBUTIONS TO LOCAL, NATIONAL AND REGIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

1. Implementation of the National Grevy's Zebra Conservation Strategy. Currently the National Grevy's Zebra Conservation and Management Strategy launched by KWS in 2008 is being implemented. The project is represented in the various implementation committees. Drs. Paul Muoria and Nick Oguge sit on the National Technical Committee which advises KWS on technical issues. Dr Philip Muruthi (the project's Scientific Advisor) sits at the National Management Committee while Paul Muoria is also a member of the Wamba Site Management Committee. We are therefore well positioned to help implement the strategy. To accomplish this goal, we share our data and experiences in these committees. At the African Wildlife Foundation where Paul Muoria and Philip Muruthi are employees, we have realigned our research and conservation activities to the National Grevy's Zebra Conservation Strategy implementation.
2. Development of National Resource Management plans. During the last one year, Samburu, Buffalo Springs and Shaba's National Reserves have been developing a Joint General Management Plan (GMP). This project provided valuable information particularly on numbers, distribution, core habitats and resources, and movements of Grevy's zebra. Such information will ensure that Grevy's zebra core habitats will not be jeopardized as tourism and community development activities expand in this important tourist destination.

7. ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND SOCIAL CAPITAL

N/A

8. LONG TERM IMPACT OF PROJECT

Taxa of conservation significance enhanced, restored or maintained

1. Scientific Name: *Equus grevyi* (Oustalet, 1882); common Name: Grevy's zebra
2. Significance of the species: endangered

3. IUCN Red List status (<http://www.iucnredlist.org/apps/redlist/details/7950/0>): Endangered A2ac; C2a(i), only found in Northern Kenya and isolated patches in Ethiopia.
4. Baseline information regarding previous status of the population: The previous population decline in Kenya between 1980 to 2007 was 68%. However, at least 2407 individuals were counted in during an aerial survey conducted in November 2008. The data from 2008 indicate a potential increase in the population in Kenya. The Ethiopian population is estimated at about 100, down from about 2000 in early 1980s.
5. Impact on the Species. The project has already had a positive impact on Grevy's zebra conservation. Firstly, awareness of the conservation issues relative to Grevy's zebra has been enhanced at the local community, national and international levels. At the local level, interaction of members of the local community with researchers, volunteers and other visitors have helped the local people appreciate that Grevy's zebra is unique and endemic to their area. It is currently being used to market the different community owned and managed conservancies as tourism destinations. At the national level, Grevy's zebra conservation status is being reviewed - we are working with the government through Kenya Wildlife Services to ensure that it is listed as a protected animal. Internationally, volunteers, tourists and other visitors help spread awareness in the global arena.

Livelihoods enhanced, restored or maintained

1. Direct employment: The Grevy's zebra project (among others) has created part-time and a few full-time employment opportunities for camp staff, research assistants/team leaders, drivers, and field guides. All non-technical members of staff are from the local community.
2. Conservation fees: While working in community areas, we pay a conservation fee of US \$20 per volunteer per day to the conservancies.
3. Local economy: The purchase of curios from the local community, payment for Samburu dance performances and purchases of food and other consumables contribute to the local economy.