

Reassessing the status of Grevy's zebra (*Equus grevyi*), and other large mammals in the Marsabit region of northern Kenya

Preliminary Report



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All photographs used in this report were taken by the survey team.

Summary

This report presents the preliminary findings of a survey to reassess the status of Grevy's zebra (*Equus grevyi*), and other large mammals in the Marsabit region of northern Kenya. This survey builds upon a previous survey of the region undertaken in 2005 (Woodfine et al. 2005). We used a combination of sociological questionnaires, transect counts and interviews with key local respondents to assess the status of Grevy's zebra and examine the threats facing this species.

While Grevy's Zebra were a primary focus in the survey effort, we also documented the status of other large herbivores and carnivores in the region. Additionally, we sought to quantify the local pastoral population's attitudes toward living with wildlife. We also sought to identify issues of human-wildlife conflict specifically in relation to hunting by people and livestock killing by predators. Here, we report on survey objectives, methods and present preliminary results on the distribution of Grevy's zebra, other wildlife and livestock. A full report will be published once analysis of the questionnaire surveys is complete.

1. INTRODUCTION

The conservation status of wildlife in the Marsabit region of Northern Kenya has not been formally established for several years. Evidence from surveys and credible anecdotes suggest declining trends in populations of large mammals. This is generally thought to be linked to various factors such as increasing human populations, and their perceived trend toward sedentary lifestyles, changing rainfall patterns and extensive drought conditions throughout Kenya.

Declining Wildlife populations are of major concern for species viability and the sustainability of biodiversity (Chivian and Bernstein 2008). One striking example of such wildlife population declines is the Grevy's zebra (*Equus grevyi*). Numbers have declined rapidly in recent years (Williams, 2002; Rowen & Ginsberg, 1992) from estimates of 15,000 in the late 1970s (Grunblatt *et al*, 1989) to current estimates of fewer than 2,500 animals (Low *et al*, 2009). The range of Grevy's zebra has also dramatically reduced in size (Williams, 2002; Kingdon, 1997). This species once ranged over large tracts of south-western Somalia and northern Kenya, as well as large areas of Ethiopia through to northern Djibouti and southern Eritrea. Today, Grevy's zebras are found only in northern Kenya and southern Ethiopia, with 93% of the global population occurring in Kenya.

Most Grevy's zebras and much of Kenya's wildlife in general occurs outside protected areas where small isolated populations share the landscape with pastoralist communities and their livestock. Such communities are key to the survival of wildlife, and particularly the Grevy's zebra across the majority of its range. Many different pastoralist communities occupy northern Kenya, and their relationships with wildlife vary greatly. For example, the Samburu have a taboo against consuming Grevy's zebra. They are generally tolerant of zebras and content to graze their cattle alongside Grevy's zebras. By contrast, the Turkana are known to hunt Grevy's zebra for meat, and the Borana use Grevy's zebra fat as a medicine.

However, beyond this basic knowledge, little is known either about the variety of uses people may have for Grevy's zebra, or the extent of this utilisation. In addition, Grevy's zebra are believed to compete with domestic livestock for dwindling water and grazing resources (Williams, 1998). Such human-related pressures and the consequential loss of wildlife habitat are thought to be the greatest threats to Grevy's zebra and other unprotected wildlife populations. Thus a detailed understanding of the nature and extent of these threats is urgently needed if mitigation strategies are to have the required impact on Grevy's zebra conservation and survival.

Grevy's Zebra Case Study

The range of Grevy's zebra in Kenya has been divided into five contiguous management zones based on current range information (Fig. 1) (KWS, 2008; Low et al., 2009)

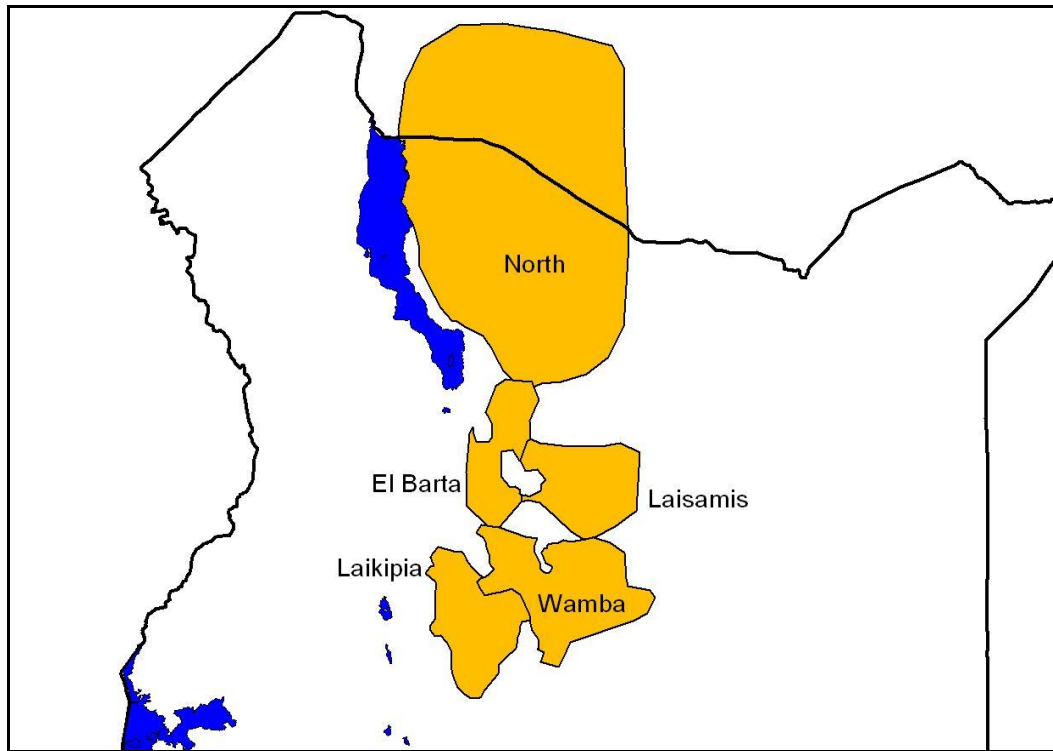


Figure 1: The five Grevy's zebra management zones within Kenya

In Wamba the establishment of strong community conservancies has led to regular monitoring and the stabilization of Grevy's zebra populations. Similarly, in Laikipia privately-owned ranches have led to improved conservation for the species. Conservation investment into Laisamis and El Barta has significantly increased in recent years and information on the Grevy's zebra population, ecology and the threats facing the species is being gathered in both areas. All four of the above management zones were included in the 2008 national survey of Grevy's zebra (Low et al., 2009) and information on the abundance and distribution of Grevy's zebra is thus considered to be current.

However, the remote North Zone which encompasses the Marsabit region was excluded from the 2008 national Grevy's zebra aerial survey due to its large size and perceived low densities of the species, making it prohibitively expensive to survey from the air.

In order to address this information gap, a survey of the North Zone was planned by the survey partners. This survey builds upon two previous surveys within the North Zone: in 2000, a comprehensive photographic census of Grevy's zebra was undertaken (Nelson, 2003); and in 2005 a survey of Grevy's zebra was implemented in Marsabit region (Woodfine *et. al*, 2009). The current survey developed on the methods used by Woodfine *et al.* (2009). However, while previous surveys focused upon distribution and numbers of Grevy's zebra, this survey also included a range of large mammals and investigated the specific threats facing wildlife in the region. Multidisciplinary tools were combined in order to verify the occurrence of Grevy's zebra and other wildlife through sociological questionnaire survey techniques, empirical transect count methodology and informal interviews with a number of local sources in the area.

We thus consulted local knowledge on Grevy's zebra distributions and other wildlife, changes in population trends over time and interactions between Grevy's zebra, other wildlife and livestock. We sought to confirm the information supplied by local pastoralists using road transect counts of all wildlife and livestock species encountered. Furthermore, we documented the different uses of Grevy's zebra by local people, investigating how these uses vary between different ethnic groups, and we attempted to determine the impact of these uses upon populations. Discussions with local people also aimed to identify the potential for local alternatives to Grevy's zebra products.

Survey goals

The specific goals of this survey were to:

1. Determine the distribution of Grevy's zebra and other large mammals.
2. Determine the relative abundance and recent trends of Grevy's zebra populations and other large mammals.
3. Investigate the relationship between wildlife and livestock.
4. Investigate the different uses of Grevy's zebra among pastoralist communities.
5. Identify threats facing Grevy's zebra in different communities.
6. Explore community attitudes towards Grevy's zebra conservation.

This report presents preliminary results that relate to goals 1, 2 and 3. A full report will be published once analysis of the questionnaire surveys is complete.

4. METHODS

4.1 SURVEY AREA

This survey was undertaken from 1-23 February 2010 using three vehicles and a team of ten people representing the implementing partner organisations. We covered the following survey locations across the Marsabit North and South Districts (Fig. 2):

1. Kargi (including Karole and eastern Chalbi)
2. North Horr
3. Sabarei/Buluk
4. Illeret
5. Sibiloi National Park (including Koobi Fora and Alia Bay),
6. Derate
7. Kalacha
8. Maikona
9. Huri Hills/Farole

We spent approximately 2 days in each area conducting questionnaires, interviews and road transects, and approximately 1 day driving between each location.

4.2 Gaps in Coverage

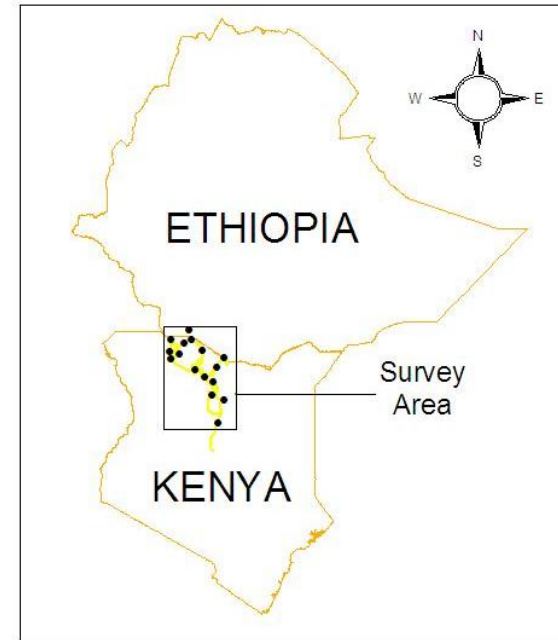
It was not possible to remain in the Sabarei and Buluk areas long enough to complete survey protocols. This was due to insecurity from ongoing cross border conflict between ethnic groups. The Buluk area in particular was cited in anecdotal feedback as being an important area for Grevy's zebra although no evidence of the species was detected by the survey. The Buluk area adjoins Chew Bahir (formerly Lake Stephanie) in southern Ethiopia and is one of the areas we had anticipated detecting Grevy's zebra. Habitat condition and grazing availability was good in these areas, however no pastoral communities or livestock were encountered between Sabarei and the northern boundary of Sibiloi National Park.

Dukana, which is close to the Ethiopian border, was also cited anecdotally as an important area for Grevy's zebra during the course of the survey. Having not been mentioned in previous surveys, we had not included this area in our plans, although we did drive though the area en route to Sabarei and once again no evidence of Grevy's zebra was detected.



Grevy's Zebra Survey Area

February 2010



Legend

- Survey Locations
- Other towns/centres
- Survey route
- Kenya/Ethiopia border

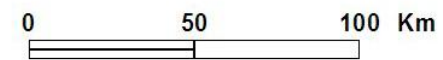


Figure 2: Map showing extent of the survey area

4.3 Ground Surveys

Survey locations were selected based on the findings of previous expeditions (e.g. Woodfine *et al.*, 2005) and reports from local sources regularly visiting these areas. Upon arrival at each location, local knowledge on Grevy's zebra distributions was used to identify potential Grevy's zebra ranging areas. Two independent ground teams in vehicles accompanied by a local guide then surveyed these areas.

Road transects, described below, were executed in an effort to detect evidence of Grevy's zebra and other wildlife. When in transit between survey locations, observers in all three vehicles scanned the landscape for wildlife and livestock. Sightings were recorded by the lead vehicle only, to eliminate any possibility of double counting. Observers communicated via hand-held radio with the lead car which compiled the data.

In addition to road transects and sightings information, local water sources were surveyed for evidence of wildlife tracks and signs. Incidental information on other species of interest including birds and reptiles were also recorded (Appendix I).

4.3 Road Transect Method

Road transects of 20 km in length were conducted both during transit legs of the journey, between survey locations, and along routes radiating away from survey locations. Observations were recorded as sightings of either livestock or wildlife and included (1) species, (2) class of animal, (3) group size, and (4) sex and age where possible. All observations were geo-referenced using Garmin 76 handheld global positioning system (GPS) units.

Observations were made from four-wheel-drive vehicles, typically at speeds of between 10 and 40 km/h. A minimum of two observers was used in each vehicle, with one concentrating on the left hand forward quadrant and one on the right hand forward quadrant. Local scouts were employed to guide observers in unfamiliar terrain and were characteristically well adapted to spotting wildlife in their environment. Expedition observers were all trained survey biologists with strong observational skills and experience.

We recorded the type of substrate, the vegetation, and mapped the route using a GPS for each transects (Fig. 3). We collected habitat reference images using digital cameras whenever the environment altered in vegetative, geological or topographical nature. All transects were completed between 02 and 20 February 2010, surveys were thus conducted in the dry season between the short rains of October and November and the long rains of March to May. No rain was recorded during the survey period.

We surveyed transects based upon the road network on the survey route and around settlements within which we conducted questionnaires. We generally estimated the detectability of animals on transects as being between approximately 1.5 km and 3 km from the road in order to allow the area of the transect survey to be estimated, and estimates of minimum and maximum relative abundance to be made (Fig. 3).

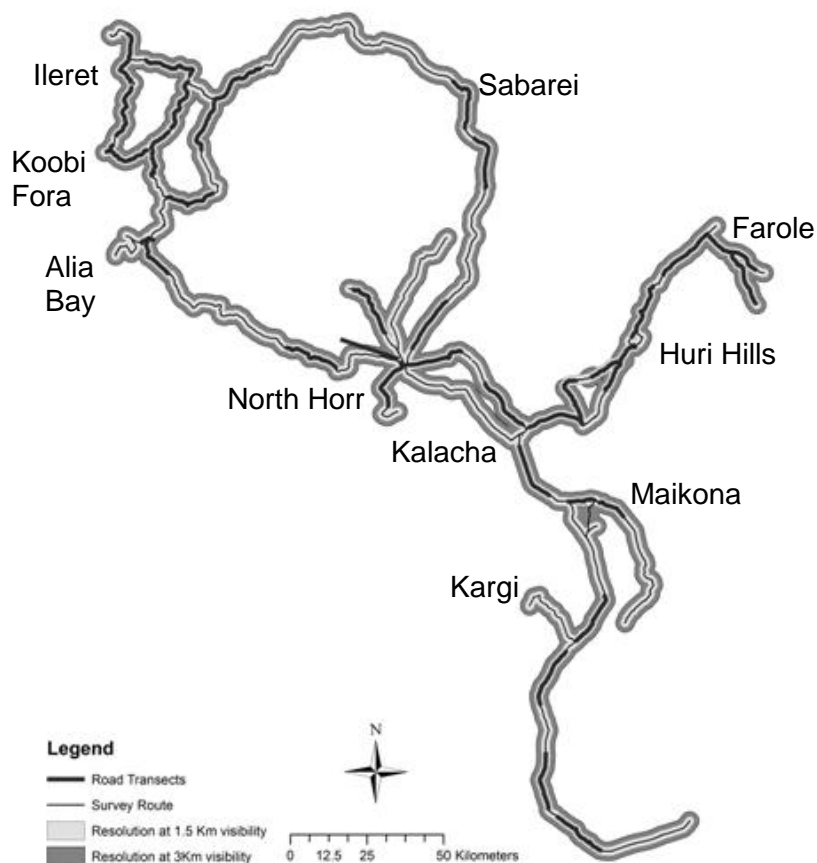


Figure 3: Marsabit survey route showing road transect sections. The survey area was estimated using animal detectability of 3 km from survey route in dark grey, and 1.5 km from survey route in light grey

4.4 Questionnaire Surveys

A questionnaire survey was tested in November 2008 through a pilot survey conducted in Laikipia District, near the southern extent of Grevy's zebra range. Members of the Laikipiak Maasai community from Naibunga conservancy, Mukugodo and Kirimon were interviewed by a two-man team comprising a trained interviewer and a recorder. The pilot survey enabled us to fully field test and amend the questionnaire survey, in accordance with best practice (Appendix II).

Interviews followed a standard structure, ensuring that the key topics were well covered. The interview team was led by an experienced interviewer who then trained locally recruited

interviewers fluent in the local language. A formal protocol of courtesy was adopted at each survey location with permission and advice regarding translators being sought from the communities' chiefs. In the majority of cases, a female and male interviewer were used to interview corresponding gender groups (women, elders and young men). Approximately 27 (± 2) interviews were conducted per survey location. The interviewer asked a series of prepared questions on Grevy's zebra-related topics as well as general wildlife and conflict topics. Some of the questions required a yes or no response while others used contingent valuation indices to rank a set of issues. Once interviews were completed, respondents collectively compiled a hand drawn map of their local area to identify the areas where Grevy's zebra were currently found.

In total we completed 159 interviews. Forty-eight percent of interviewees were women and 52% were men. The questionnaire and map data are currently being analysed and will be presented in the final report detailing the full results of the survey.



Figure 1: Gabbra woman being interviewed by a recruit from her community, in Farole settlement.

4.6 Informal Interviews

Informal interviews with individuals and groups were conducted to augment our formal data collection. Persons informally interviewed included local community chiefs, Kenya Wildlife Service (KWS) staff at Alia Bay KWS headquarters in Sibiloi National Park, the caretaker at Koobi Fora, administration police outposts in Derate and Sabarei, community conservation groups in Farole and Kalacha, local herders near the Urowa wells outside North Horr (Fig. 4), and missionaries living in North Horr, Kalacha and the Huri Hills.



Figure 4: Talking with local herders at Urowa wells outside North Horr

5. PRELIMINARY RESULTS

We first present preliminary results from the transect data on overall trends observed in wildlife and livestock. We then describe our initial observations on the status of Grevy's zebra and other wildlife. Finally, we discuss conservation issues that appear to affect wildlife within the survey area.

5.1 Wildlife and livestock

Parameters describing the effort expended in estimating livestock and wildlife abundance are given in Table 1 below. Encounter rates revealed that although groups of livestock and wildlife were sighted equally often (Table 2) the disparity between relative abundance indices suggested that livestock outnumbered wildlife by approximately 64:1. Wildlife thus represented less than 2% of the animals observed during the survey.

Table 1: Parameters describing the estimated effort of sampling for two measures of sightings resolution: 3 km visibility and 1.5 km visibility.

Parameter	Distance (Km) or Area (Km²)
Total distance driven	1642
Total length of transects	720
Area of Road Transect Survey at 3 km detectability	7211.74
Area of Road Transect Survey at 1.5 km detectability	3773.69

Table 2: Relative abundance indices for livestock and wildlife encountered on road transect surveys.

	N	% Group Encounter	km per Encounter	% Abundance	Animals per Km
Livestock	29,545	53	3.0	98.5	34.81
Wildlife	460	47	3.3	1.5	0.002

Plotting observed locations of wildlife and livestock suggests that wildlife and livestock are found in different areas. Larger concentrations of wildlife were observed in areas where fewer livestock were seen. For example, three low livestock areas include Alia Bay and Koobi Fora in Sibiloi NP, and Farole (Fig 5).

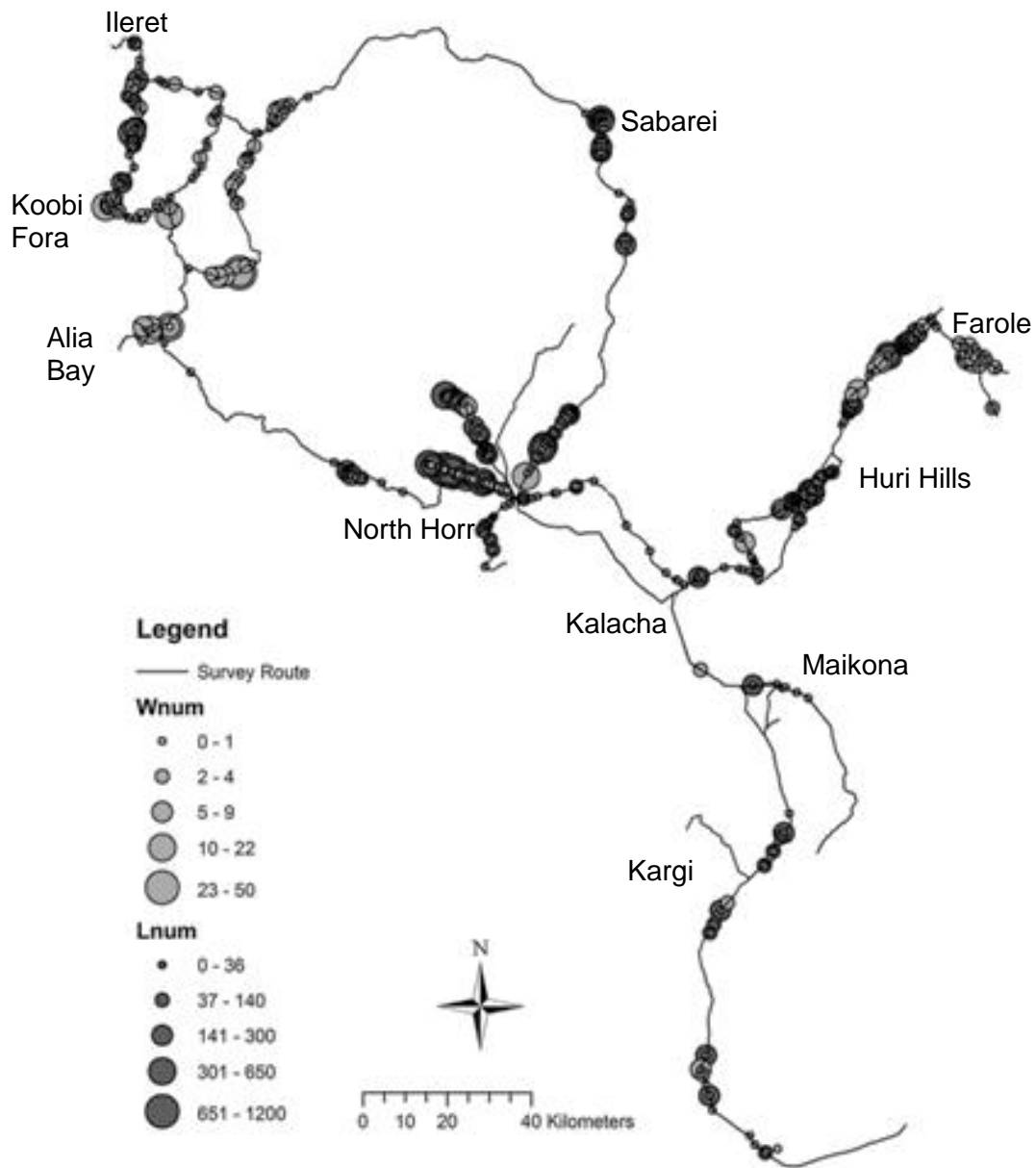


Figure 5: Livestock and wildlife sightings as detected along 20 km road transects

5.2 Wildlife distributions

In this section we present preliminary observations of the status of Grevy's zebra and other wildlife, based upon interviews, transect data and the observations of the survey team. Information for key species groups is presented per survey area.

Grevy's zebra

Across the entire survey area there was little evidence of Grevy's zebra. We did not observe any Grevy's zebra along our road transects (Fig. 6). Two sightings occurred close to the settlement of Kargi, and the spoor of several animals was detected at several water points in the Kargi area. KWS patrols reported evidence of seeing Grevy's zebra between Alia Bay and Koobi Fora in Sibiloi NP in 2009. We found no evidence of Grevy's zebra foals in any survey area.

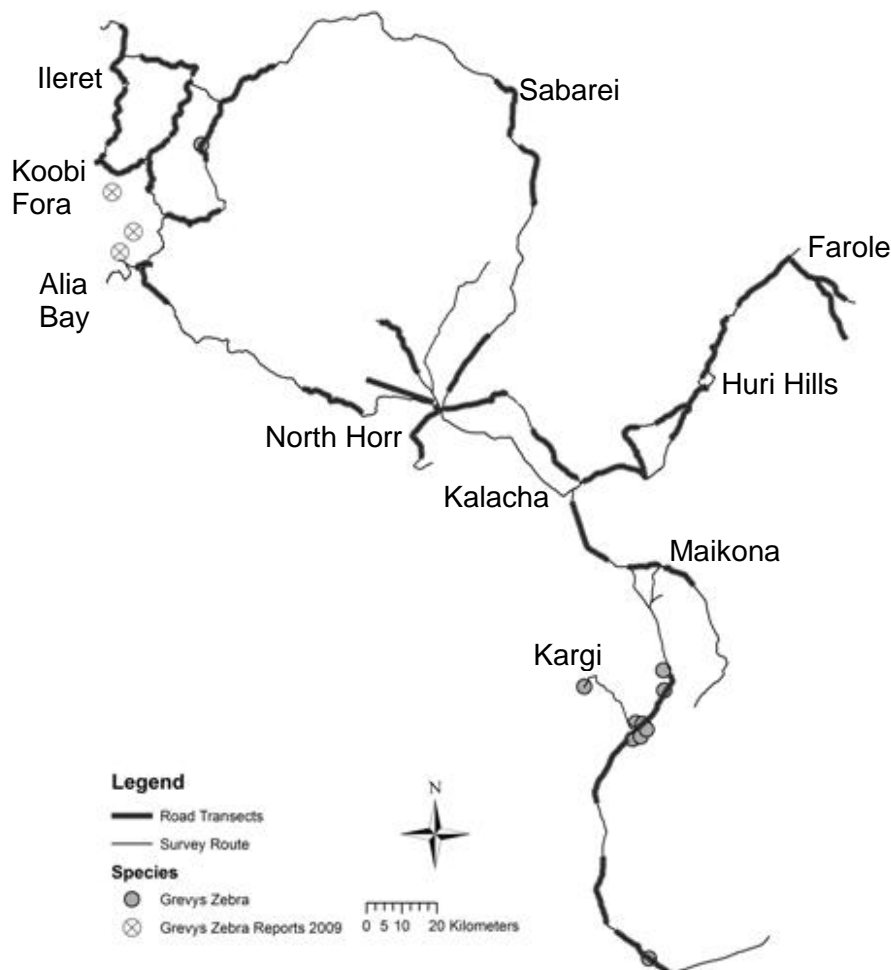


Figure 6: Locations of Grevy's zebra tracks and two sightings on the survey route; none of the sightings occurred during road transects.

Our survey results were compared to previous surveys of the North Zone. It is worth noting that methods used and coverage were quite different between the surveys. However,

overall, in comparison to the survey undertaken in 2000 (Nelson & Williams, 2003), Grevy's zebra appear to have undergone a severe decline across their far northern range (Table 3).

Table 3: Results from Grevy's zebra surveys undertaken in 2000, 2005 and 2010

Location	Survey Year		
	2000 ^a Nelson & Williams (2003)	2005 ^b Woodfine <i>et al</i> (2009)	2010 ^c This Survey
Kargi (including Karole) & Maikona	✓ (66)	✓ (1) † (14)	✓ (2) † (2 + 3)
Kalacha	✓ (30)	† (2)	X
North Horr	-	#	X
Sibilo	✓ (16)	#	#
Derate	-	#	#
Sabarei	✓ (93)	#	#
Huri Hills	-	-	X
Farole	-	-	X

Key: ✓ = sighting; † = spoor; # = anecdotal evidence of continued presence; X = reported but no evidence detected; - = not reported.

a) The 2000 survey was an intensive photographic survey using mark-recapture techniques. Search effort was greater with a minimum of five days of survey in each survey area.

b) The 2005 survey used informal interviews with local communities, supported by the collection of direct and indirect evidence from the field

c) The 2010 survey used road transect and interview techniques as described in this report

Kargi/Karole & Maikona-Kalacha

From anecdotal evidence, observations of Grevy's zebra spoor, and two separate sightings of the same two individuals, we infer that small, highly mobile groups of Grevy's zebra exist around Kargi, Maikona and north of Kalacha (eastern Chalbi desert, Fig. 7).



Figure 7: Two male Grevy's zebra sighted in the eastern Chalbi – these were the only Grevy's zebra seen within the defined survey area.

Sibilo National Park

Information on Grevy's zebra was provided by KWS rangers for Grevy's zebra sightings in late 2009, in southern and central Sibilo National Park (approximately 15 individuals). Previous sightings by KWS in 2009 occurred in an area where we found a large number of livestock. Despite a more intense search effort within the park, we saw no Grevy's zebra and only recorded spoor for two individuals in the current survey. The illegal use of park resources by communities based around Illeret was cited as an ongoing challenge faced by the KWS management team at Sibilo (Fig 6).

Sabarei/Buluk

Local knowledge indicated that Grevy's zebra are occasionally found around Buluk and south of Chew Bahir where there is habitat suitable for Grevy's Zebra (Fig. 8). However, we were unable to survey this area extensively due to insecurity¹.

¹ Towards the end of March 2010 a sighting of 20 Grevy's zebra in Chew Bahir was reported by Jamie Roberts of Tropic Air during a return flight by helicopter from Ethiopia



Figure 8: Grass and ground cover were plentiful in the vicinity of Buluk. This likely is a consequence of infrequent utilisation by pastoralists owing to political insecurity.

North Horr

Grevy's zebra were not detected around North Horr. Densities of livestock were extremely high (Fig. 9), which may explain the general absence of wildlife. Interview responses indicated that Grevy's zebra have not been seen in the area for several years.



Figure 9: Herds of small stock (sheep and goats) travelling to water in North Horr

Huri Hills/Farole

Historically no permanent water occurred in the Huri Hills or Farole areas. However, recent drought prevention aid from the European Union has made water available to pastoralists and their herds of livestock by installing runoff catchments and underground reservoirs. This has led to an increase in the number of permanent settlements and livestock. However, the water remains inaccessible to wildlife. Consequently, Grevy's zebra remain undetected in these areas, although they have been sighted grazing to the south of the Huri hills by resident catholic missionaries.

Large herbivores

In addition to Grevy's zebra, large herbivores detected included: plains zebra (*Equus burchelli*), Grant's gazelle (*Gazella granti*), beisa oryx (*Oryx gazella beisa*), tiang (*Damaliscus lunatus tiang*), gerenuk (*Litocranius walleri*), and Somali ostrich (*Struthio camelus molybdophanes*). Interviews indicated a significant decline of all large herbivores in all survey areas. Large herbivores were observed at low density in most survey sites, with Grant's gazelle, Somali ostrich and gerenuk being most frequently sighted.

Large herbivores were only detected in greater numbers in southern Sibiloi National Park where herds of tiang, oryx, Grant's gazelle and plains zebra were observed (Fig. 10).



Figure 10: A large herd of tiang seen near Koobi Fora along the Turkana lakeshore in Sibiloi National Park

Large herbivores exhibited highly vigilant behaviour, and tended to take flight easily, in all locations except Farole and the Huri Hills. This may be a reaction to possible persecution by people.

Carnivores

Hyaena

Evidence of hyaena was observed at a number of survey sites. Both striped (*Hyaena hyaena*) and spotted (*Crocuta crocuta*) were reported. Additionally, sightings reported in the questionnaire survey suggest they are ubiquitous throughout the Marsabit region (Fig. 11).

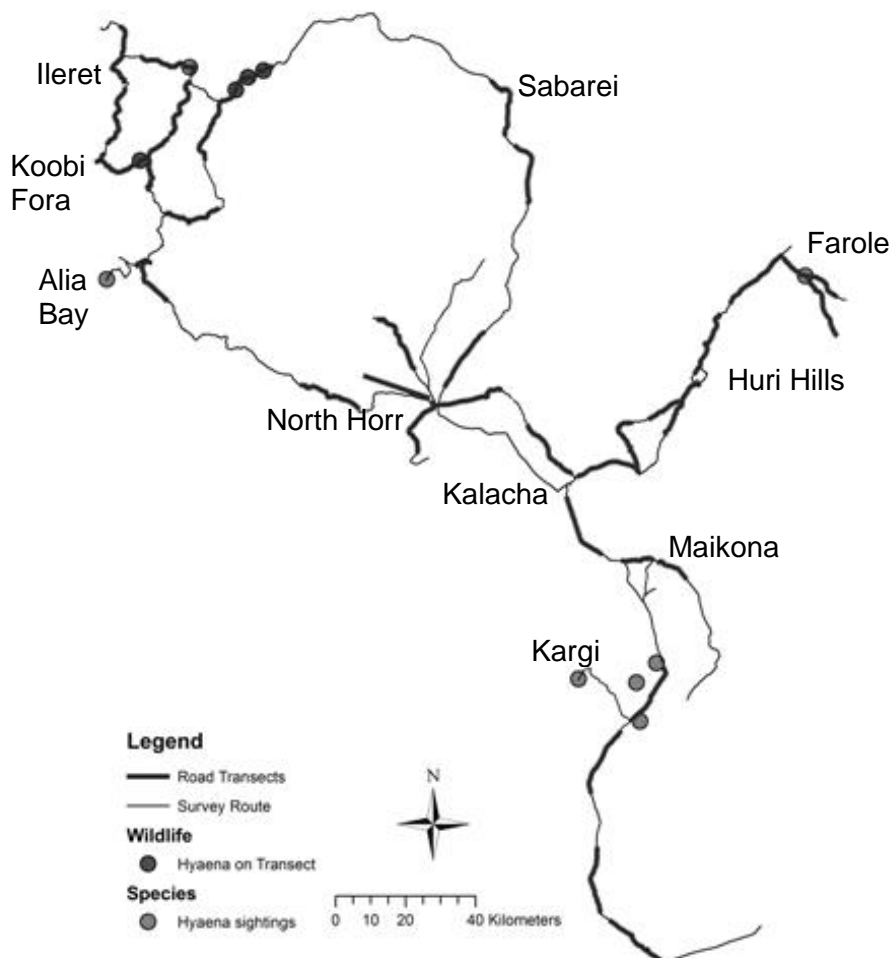


Figure 11: Locations of hyaena tracks detected on road transects, a sighting (camera trap) and other tracks sighted during the survey.

Lion

No evidence of lion (*Panthera leo*) was detected during the survey, however reports of lion were received for the Huri Hills, Farole, Buluk and Sibilo National Park (Fig. 12).

Furthermore, feedback from KWS officers stationed at Alia Bay indicated a population of 25 lions exists within Sibilo National Park.

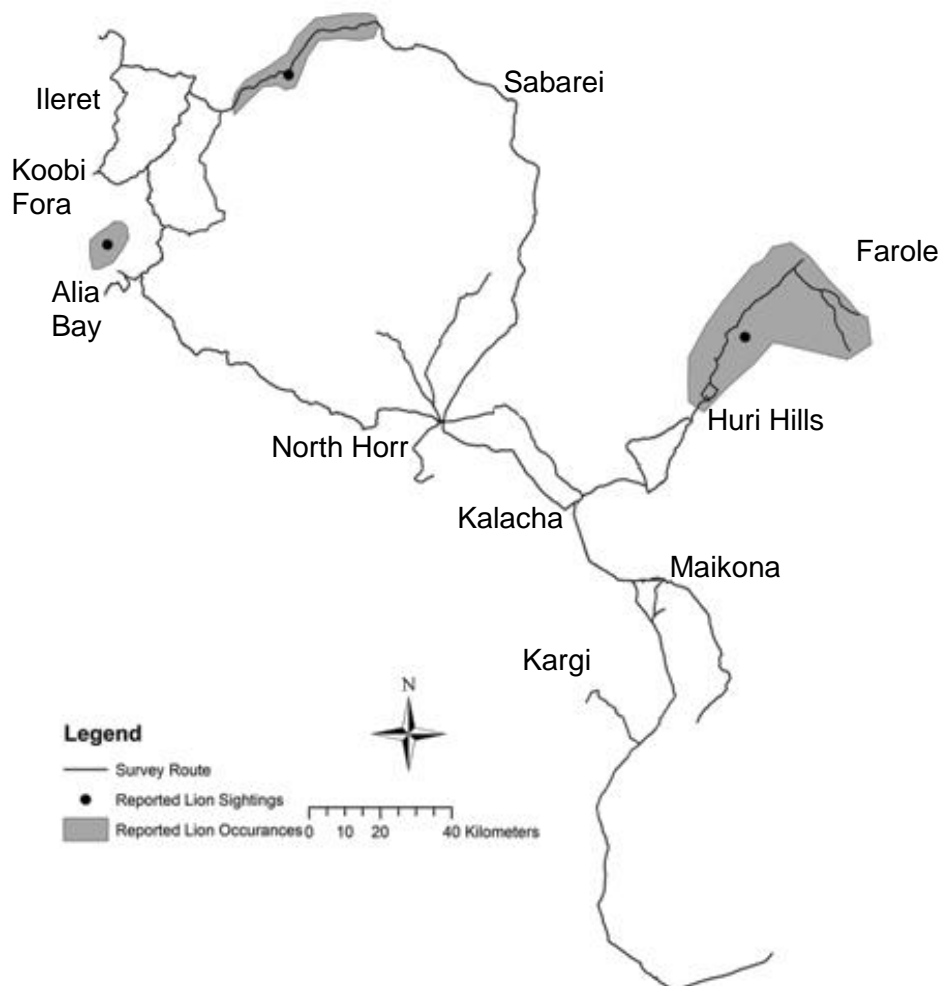


Figure 11: Lion locales (grey shaded areas) and reported locations of sightings (black points) within the past 12 months. Locales were estimated based on conversations with local pastoralists, police reservists and Catholic missionaries encountered in these areas.

Other large carnivores

Leopard (*Panthera pardus*) and cheetah (*Acinonyx jubatus*) were not detected; however these species were cited in several questionnaires. No indication of their relative distribution or abundance was given by the respondents.

Small carnivores were detected occasionally, including evidence of black-backed jackal (*Canis mesomelas*), honey badger (*Mellivora capensis*), serval cat (*Felis serval*), and civet cat (*Civettictis civetta*).

5.3 Conservation issues

In the following section we discuss key issues that we perceive to be influencing wildlife distributions in northern Kenya. This information is summarised from questionnaires and separate interviews with several respondents.

Access to water

In many of the survey areas we observed that recent development of existing water sources had taken place. In order to improve the quality of the water, walls have been built around water so that livestock cannot access the water directly and foul it (Fig. 12). This means that wildlife are also completely excluded from these water sources. This is likely to be a contributing factor to the decline of Grevy's zebra and other water-dependent wildlife in some areas (de Leeuw *et al.* 2001).



Figure 12: Recent development of existing water sources

Proliferation of guns leading to increased hunting

The increased availability of firearms means that more people in this region are now armed. This was given as one of the primary reasons for an increase in the illegal killing of wildlife and is directly linked to the issue of eroding traditional values which is discussed below.

Breakdown of cultural taboos

We heard that within the Gabbra community there were traditionally taboos against eating wildlife. Nowadays, these taboos are being ignored or dismissed by pastoralists as irrelevant to current conditions. Instead, beliefs about the medicinal properties of wild animal parts are being promoted. This has led to increased illegal hunting of wildlife, particularly by the young men out in the *fora*². Wildlife may also be being targeted at water sources, since these represent passive traps which wildlife must necessarily visit. This was given as one of the main reasons that Grevy's zebra no longer water at any of Kalacha's permanent water sources.

² The word 'fora' refers to areas to which herders have migrated for grazing their livestock where they construct temporary kraals and may live for several months.

Rainfall

People attribute declines in wildlife to failure of rains in the recent past. People believe that this has caused wildlife to die or move to other more fertile areas.

Community Conservation Groups

During the survey we came across two conservation groups that were led by the local communities in Farole and Kalacha. Such locally-organised initiatives are rare in Kenya and the motivation for their existence was refreshing to discover.

Farole

AJEMA – Ardha Jilla Ecosystem Management Group

The AJEMA is a registered community-based organisation. The people of Farole regard the forested hill adjacent to their settlement as a sacred site, believing that their ancestors dwell upon it and on the red soil surrounding the base of the hill. The Farole community manages the area as a wildlife conservancy in which no wildlife or forest products may be harvested. They report that there has been an increase in wildlife populations since establishing the conservancy. AJEMA is using the same cultural traditions that they use to manage the forest to expand the area under conservation management to 600 km². The organisation employs part-time scouts to monitor and secure the wildlife. Membership of AJEMA is open to the community and is based on a household level so that both genders are represented. AJEMA has a five-year plan for developing its conservation and cultural activities for the area.

Kalacha

Kalacha Wildlife Conservation Group

Members of the Kalacha community formed the Kalacha Wildlife Conservation Group (KWCG) in response to the disappearance of wildlife around the Kalacha community. Its mission is to conserve wildlife for future generations. KWCG widely spreads a wildlife conservation message through the local nomadic communities.

6. DISCUSSION

Preliminary results confirm the conclusion by Woodfine *et al* (2009) from their 2005 survey that Grevy's zebra persist around Sibiloi National Park and in the eastern Chalbi Desert. These populations appeared vulnerable to localised extinction. However, evidence from the current survey indicates that Grevy's zebra numbers and range may have declined further since 2005. In Kargi, Kalacha, Sibiloi and Sabarei we infer that significant declines have occurred.

Similar declines have occurred in populations of other large mammals. Here, we present several preliminary observations on reasons for these population declines. More complete analyses will be presented in our final report. First, livestock outnumbered wildlife by many orders of magnitude. Livestock increases in northern Kenya appear to be related to factors such as the creation of new permanent water sources in areas where they have historically not occurred, such as the Huri Hills. Such high observed numbers of livestock are likely to displace wildlife as seen in the spatial analysis of our transect data.

Access to water is a critical issue for Grevy's zebra and other large mammals (*de Leeuw et al*, 2001). Water was only available to wildlife at livestock watering locations. Wildlife were reported and observed to drink at night in order to avoid conflict with humans and livestock. During the day, wildlife was never sighted amongst livestock herds and was typically separated from livestock herds by several kilometres.

Grevy's zebra were only observed in areas where water is freely accessible, e.g. in the eastern Chalbi, where water sources such as Karole or Maidahat springs cover a large area with many access points and therefore cannot be easily controlled (Fig. 13). In Sibiloi National Park the lakeshore stretches down the entire western boundary of the park providing multiple access points at which animals may drink.

Poaching also appears to be a major factor causing wildlife declines, with a proliferation of guns and a relaxation of cultural taboos leading to more widespread illegal hunting.

On a positive note, several communities had taken action to establish community-based conservation initiatives within their locality. In Farole, efforts to protect Farole hill for cultural reasons has led to increases in wildlife and improved wildlife habitat around the mountain. Such initiatives clearly have the ability to influence wildlife populations and may act as catalysts for conservation in the far north of Kenya.



Figure 13: Maidahat springs in the eastern Chalbi

7. FURTHER OUTPUTS

In addition to this report, the following further outputs are planned:

- Updated range map reflecting current status of Grevy's zebra
- Articles for popular press
- Formal report detailing full results and recommendations
- Peer-reviewed scientific publications

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APPENDIX I

Marsabit North & South Districts: Bird List

Abdim's Stork
African Fish Eagle
African Mourning Dove
African Spoonbill
Black-backed Puffback
Black-chested Snake Eagle
Black-crowned night Heron
Black-headed Heron
Black-necked Grebe
Black-Shouldered Kite
Blacksmith Plover
Black-tailed Godwit
Black-winged Stilt
Brown-necked Raven
Cape Rook
Carmine Bee-eater
Chestnut Bellied Sandgrouse
Crested Bustard
Crested Lark
Eastern Pale Chanting
Goshawk
Egyptian Goose
Egyptian vulture
Fischer's Starling
Fulvous Whistling Duck
Glossy Ibis
Goliath Heron
Great Egret
Greater Flamingo
Grey Heron
Hadada Ibis
Helmeted Guineafowl
Heuglin's Bustard
Hottentot Teal
Jackson's Hornbill
Kittlitz's Plover
Knob-billed Duck
Kori Bustard
Lappet-faced vulture
Laughing Dove
Lesser Flamingo
Long-tailed Cormorant
Magpie-Starling
Mallard
Marabou Stork
Masked Lark
Montagu's Harrier
Namaqua Dove
Osprey
Pied Avocet
Purple Heron
Red and Yellow Barbet
Sacred Ibis
Somali Bee-eater
Somali Ostrich
Spur-winged Goose
Squacco Heron
Superb Starling
Tawny Eagle
Thekla Lark
UID Gull
UID Pelican
UID Pratincoles
UID Sandpiper
UID Tern
UID Wheater (probably Pied)
White Bellied Go-away-bird
White billed Buffalo Weaver
White Crowned Starling
White faced Whistling Duck
White headed Buffalo Weaver
White Storks
White-naped Raven
Wooly-necked Stork
Yellow Wagtail
Yellow-billed Hornbill
Yellow-billed Stork

Reptiles of Interest

The following sightings have been forwarded to the authors of *A Field Guide to the Reptiles of East Africa* (2002).



Blue headed tree agama (*Acanthocercus atricollis*) seen in the Huri Hills



North-east Carpet Viper (*Echis pyramidum*) seen at Kalach Dida pool near Kalacha



Gravid female Ruppell's agama (*Agama ruppelli*) seen in the lower gravel plains of the Huri Hills.

APPENDIX II

Questionnaire

I am (*Masiare Ole Ranah from il Polei*). I am going to ask you some questions about Grevy's zebra. I am doing this for a project so that we can learn more about local attitudes, uses and traditions about Grevy's zebra.

This questionnaire will take about 45 mins. I would appreciate your cooperation and request that you answer these questions as frankly and completely as possible.

The answers you give are for information only. Your names will not be used in any report and no reward or punishment will be given based on your answers.

Name	
GPS	N:
	E:
Group Ranch	
Location	

Age/Age Set	
Sex	
Clan	

1. Please tell me all of the wild animals that live in the area around this boma (your place) that you can think of:

	Local Name	English Name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

2. When was the last time you saw these animals around this boma/place?

Answer	Code	Zebra	Oryx	Eland	Giraffe	Small Antelope	Elephant	name:
Yesterday	1							
Today	2							
Last week	3							
Last month	4							
Last year	5							
>1 year	6							
Where?								

Answer	Code	Lion	Cheetah	Leopard	Spotted hyaena	African wild dog	Jackal
Yesterday	1						
Today	2						
Last week	3						
Last month	4						
Last year	5						
>1 year	6						

Where?							
--------	--	--	--	--	--	--	--

Aja loitukoshi liyolo? Indim aitapaasha? Tolimu nkam enye pokira?

2. How many types of zebras do you know?

Answer	CODE
0	1
1	2
2	3
3	4
4	5

Can you differentiate between them?

Answer	CODE
Yes	1
No	2
I am not sure	3

3. Tell me their names in your language?

Answer

Akwa kwapi kulikai etii irikankan? Keidimayo metaa aja irkankan ootangaiyoki tenkop?

4. Which other places in the world do you think that Grevy's zebra are found?

Answer

5. How many do you think there are left in the world?

Answer	CODE
0-100	1
100-500	2
500-1000	3
1000 – 2000	4
2000 – 5000	5
5000 – 10 000	6
> 10 000	7

6. Have you ever seen a Grevy's zebra?

Answer	Code
Yes	1
No	2
I am not sure	3

7. And where do you see them– list some places where you see them most? (general)

Itodua orkanka?te aji edol oleng?(general)

Answer	Answer

8. Have you ever seen a GZ in your group ranch?

Answer	Code
Yes	1
No	2
I am not sure	3

9. If yes, when was the last time that you saw GZ in your group ranch? Last week, Last month, year or how many years? Please tell me as exactly as you know.

Itodua orkanka te group ranch inyi? Anuenkata emusho nitodua Orkanka? Weeki, Olapa, olari, ana ilarin aja? Tolimu ana eniyolo.

Answer	Code
Yesterday	1
Today	2
Last week	3
Last month	4
Last year	5

Answer	Code
2008	6
2007	7
2006	8
2005	9
2004	10

10. How often do you see Grevy's Zebra on your ranch?

ANSWER	CODE	Number of sightings					
vEvery day	1	0	1	2-5	5-10	10-20	>20
Every week	2	0	1	2-5	5-10	10-20	>20
Every month	3	0	1	2-5	5-10	10-20	>20
About once or twice a year	4	0	1	2-5	5-10	10-20	>20
Never	5	0	1	2-5	5-10	10-20	>20
I am not sure	6	0	1	2-5	5-10	10-20	>20

11. How many herds of Grevy's zebra do you see in your group ranch?	
ANSWER	CODE
0	1
1	2
2-5	3
5-10	4
10-20	5

12. How large are these herds?.

Mbooitie aja orkankan oshi idol te group ranch inyi? Kebaa nena booitie? Aja temboo?

ANSWER	CODE
1	1
2-5	2
5-10	3
10-20	4
>20	5

Keetai tokitin oshi naitodolu ajo ketii irkankan te group ranch inyi? Nyoo nena naitodolu, naakatitin aja oshi idol tenkolong, tewiki, tolapa ana tolari

13. Are there any signs (tracks, dung etc) that shows that GZ are in your group ranch.

ANSWER	CODE
YES	1
NO	2
I am not sure	3

14. If yes, what kinds of signs

Answer

15. and how often do you see them? Every day, every week, every month or year.

Answer	CODE
Every day	1
Ever week	2
Every month	3
Every year	4

16. Where do you see GZ or signs of GZ in your group ranch? Name some places and the signs you see.
Tiaji oshi idol irkankan aashu intokitin naitodolu ajo ketii irkankan group ranch inyi? Tolimu ng'uetin nitodolie te group ranch inyi?

Place	Sign

17. Where do you think GZ drink water in your group ranch? Name the places.
Tiaji oshi ewok irkankan enkare te group ranch inyi?tolimu nenie ng'uetin.

a. In the dry season they drink at these places. <i>Tenkata olameii</i>
b. In the rainy season they drink at these places. <i>Tenkata olarii (enkata natasha)</i>

18. What time of day do you think GZ drink water in your group ranch? .
Aakaata oshi ewok irkankan enkare te group ranch inyi? Dama ana kuarie, teipa, tesiran? Tolimu ana eniyolo.

Answer	CODE
Day	1
Night	2
Morning	3
Evening	4

19. In your group ranch, what do Grevy's zebra do when they see people?
Te group inyi, kaa oshi eas irkankan tenedol iltungana?

ANSWER	CODE
a. They run away. <i>Kekuet</i>	1
b. They walk away. <i>Kepuo ake akiti</i>	2
c. They stand still. <i>Keitashé</i>	3
d. They continue grazing. <i>Kedaa</i>	4
e. Say anything else that they do. <i>Ke etai enkai naas.</i>	5

20. Why do they react in the way they do? <i>Ainyo peiye eas inia?</i>
21. What do you do when you see Grevy's zebra in your group ranch? <i>Kaa iyas tinidol irkankan te group ranch inyi?</i>
22. Why do you do what you do? <i>Ainyo peiye ias inia?</i>

23. In your opinion, has the number of Grevy's zebra in your group ranch increased, decreased or stayed the same, over the last ten years.

Amaa tenduata ino, ketoponari irkankan te group ranch inyi, ketaa kuti, ana injiake eba anaa apake lari tomon?

Answer	CODE
Increased	1
Decreased	2
Stayed the same	3

24. Why do you think so? Rank your reasons in order of importance. *Ainyo? Tolimu anaa nedukoya naatatipat.*

Answer : I think this has happened because...
1.
2.
3.
4.
5.

25. In your opinion, has the places where you see GZ in your group ranch changed over the last ten years.

Answer	CODE
Yes	1
No	2
I am not sure	3

26. Why do you think so? Rank your reasons in order of importance.

Amaa tenduata ino keibeleyenate ingueitin nidolie irkankan too larin tomon oishunye? Ainyo? Tolimu anaa nedukoya naatatipat.

Answer : I think this has happened because...
1.
2.
3.
4.
5.

27. In your opinion, will you still have GZ in your group ranch ten years from now? *Amaa tenduata ino, keidimai peetii ake irkankan te group inyi mpaka larin tomon?*

ANSWER	CODE
a. Yes, definitely. <i>Ee pae</i>	1
b. Maybe. <i>Keidimayu</i>	2
c. It might not be. <i>Keidim ataa meidimayu</i>	3
d. Definitely not. <i>Meidimiyu pii</i>	4
e. I don't know. <i>Maiyolo</i>	5

28. Why do you think so? Rank your reasons in order of importance I think asking people to rank is going to confuse and delay - it will be enough to get these answers coded in toype of problem and ranked by frequency of occurrence. *Ainyo? Tolimu anaa nedukoya naatatipat.*

Answer : I think so because...
1.
2
3
4

29. Do you think having GZ in your group ranch is *Impikiria ajo kore peeku iatata irkankan te group ranch inyi naa?*

ANSWER	CODE
a. Very good. <i>Kesidai oleng</i>	1
b. Good. <i>Keisidai</i>	2
c. Neither good nor bad <i>Meata eniko</i>	3
d. Bad. <i>Ketorono</i>	4
e. Very bad. <i>Ketorono oleng</i>	5

30. Why do you say that? Rank your reasons in order of importance. *Ainyo? Tolimu anaa nedukoya naatatipat.*

Answer : I say that because...
1.
2
3
4

31. What are the benefits (good things) you experience from having GZ in your group ranch? Rank them in order of importance. *Nyoo ntokitin sidain nitumito naigua irkankan liatata tena group ranch. Tolimu anaa nedukoya naatatipat.*

Answer : the benefits of having GZ are:
1.
2
3
4
5

32. What benefits (good things) do you think others in your group ranch experience from having GZ in your group ranch? Rank the benefits in order of importance.

Nyoo ntokitin sidain nitumitoto naigua irkankan liatata tena group ranch. Tolimu anaa nedukoya naatatipat.

Answer : the benefits to others of having GZ are:
1.
2
3
4
5

33. What are the problems (bad things) you experience from having GZ in your group ranch. Rank them in order of importance.

Nyoo ntokitin torok nitumoto naigua irkankan liatata tena group ranch. Tolimu anaa nedukoya naatatipat.

Answer : the problem with GZ are:
1.
2
3
4
5

34. What problems (bad things) do you think others in your group ranch experience from having GZ in your group ranch. Rank them in order of importance.

Nyoo ntokitin torok nitumototo naigua irkankan liatata tena group ranch. Tolimu anaa nedukoya naatatipat.

Answer : the problems with others have because of GZ are:
1.
2
3
4
5

35. What are your traditional uses for Grevy's zebra? Rank the uses in order of importance.
Amaa torkwak linyi, kakwa kiasin iyasiesie irkankan? Tolimu anaa nedukoya naatatipat.

Answer : the traditional uses for Grevy's Zebra are:
1.
2
3
4

36. Have you ever used Grevy's zebra in the past? For what purpose.
Ke eta apa inkiasin niyasiesie irkankan?

Answer	CODE	If yes, the purpose is...
Yes	1	
No	2	
I am not sure	3	

37. Consider the uses of GZ in the previous two questions (21 and 22). Can you think of something else to use for that purpose, instead of Grevy's zebra?
Ingurai eneitaasi irkankan te(tekeperr, 21 and 22). Impikirai ajo nyoo kulikai naidimi aitumiai nemera irkankan? Tolimu.

Answer	CODE	If yes, the other thing which would suit that purpose is...
Yes	1	
No	2	
I am not sure	3	

38. Are there any myths/tabooes/stories about GZ in your community? Please tell.
Ketii nkaatini/orkwaak/entolo naipirita irkankan tolosho linyi? Tolimu.

Answer	CODE
Yes	1
No	2
I am not sure	3

39. The myths/tabooes/stories about Grevy's Zebra are:

40. How important is it to have Grevy's zebra in your group ranch?
Ijoyie keeta tipat eeatai irkankan te group ranch inyi?

ANSWER	CODE
a. Very important. <i>Keeta tipat oleng</i>	1
b. Important. <i>Keeta tipat kiti</i>	2
c. Neither important nor unimportant <i>Meata eniko</i>	3
d. Unimportant. <i>Meeta tipat</i>	4
e. Very unimportant. <i>Meeta tipat opii</i>	5

41. Why? Ainyo?

42. Do you think Grevy's zebra have a role in the development of your group ranch? *Ijoyie keeta irkankan enaidim aatas naipirta maendeloo/prosperity/ te group ranch inyi?*

ANSWER	CODE
a. A very big role. <i>Esapok oleng</i>	1
b. A big role. <i>Esapok</i>	2
c. Small role. <i>Enkiti</i>	3
d. Very small role. <i>Enkiti oleng</i>	4
e. No role. <i>Meetai.</i>	5

43. Why do you think so? *Kajieko na ainyo?*

44. 27. What livestock do you have? List the numbers of each type. *Akua suam iaata? Naa aja temboo?*

Livestock type	Number of each

45. Has the numbers of your livestock increased, decreased or remained the same for the last ten years. Do you know how many there were ten years ago? *Ketoponari anaa ketaa kuti imbooitie inono osuam too larin tomon oishunye? Ketaa kuti, ketaa kumok, ana injiake eba anaa apake. Iyolo eneba apai naa aja temboo.*

If he did not own herds 10 years ago, then ask about his father's herd.

Answer	CODE
Increased	1
Decreased	2
Stayed the same	3

46. What are the reasons? *Ainyo?*

The reasons for this are:

47. Name the locations in your group ranch where you graze your livestock. *Tiaji oshi irita isuam inono te group ranch inyi?*

ANSWER	Location
a. In the dry season. <i>Tenkata olameii</i>	
b. In the rainy season. <i>Tenkata tolarii (enkata natasha)</i>	

48. Where do you water your livestock in your group ranch? *Kaji oshi intook isuam inonok te group ranch inyi?*

ANSWER	Location
a. In the dry season. <i>Tenkata olameii</i>	
b. In the rainy season. <i>Tenkata tolarii (enkata natasha)</i>	

49. If possible, Identify the locations of these waterholes on the map.

Waterhole name	GPS location (if possible)

50. Which town/center are you close to?

Kaa town nikitaa niki? Kebaa elakuani aitero tenkang ino? Katitin aja ilo town tewiki?

Name of Town centre

51. How far is it from your home?

How far is it from your home?	CODE
<1 kilometre	1
1 – 2 km	2
2 – 3 km	3
3- 4 km	4
4 – 5 km	5
5 – 6 km	6
6 – 7 km	7
7 – 8 km	8
8 – 9 km	9
9 – 10 km	10
> 10 km	11

52. How often do you go there in a week?

I go there ----- times a week	CODE
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8

53. What is your education level? *Kebaa enitabaiye tenkisoma?*

Education level	CODE
Primary school	1
Secondary school	2
College	3
University	4
Other	5
Other	6
Other	7

54. What is your source of livelihood? Rank them in order of importance.
Kaa oitie oshi itumie iye endaa ino onenkang ino? Tolimu anaa nedukoya naatatipat.

Livelihood	CODE
1.	1
2.	2
3.	3
4.	4
5.	5
6.	6
7.	7

55. Have you ever participated in a wildlife conservation campaign or meeting or workshop or exposure tour? *Keetai eramat en kop nishom enkitengena? Tolimu.*

Answer	CODE
Yes	1
No	2
I am not sure	3

56. What activity did you take part in?

Activities I have participated in:	CODE
Conservation campaign	1
Conservation meeting	2
Conservation workshop	3
Conservation tour	4
Other (please specify)	5

57. Can you sort these pictures into animals that are a big problem, small problem or no problem around this boma, and explain why? *(show picture cards):*

	Identification		Problem?			Don't know animal	Doesn't occur here	Why is it a problem?
	Right Y/N	Spp confused with	Big	Small	No prob			
Giraffe								
Elephant								
Lion								
Leopard								
Cheetah								
African wild dog								
Spotted hyaena								
Striped hyaena								
Impala								
Tiger								
Serval								
Rhino								
Crocodile								
Snake								
Buffalo								
Jackal								
Wildebeest								
Warthog								
Zebra								