

Conservation and Management Strategy for Grevy's Zebra (*Equus grevyi*) in Kenya

2007-2011



Formulated at the Grevy's Zebra
National Stakeholders Workshop
held at Naivasha in 2007

Compiled by:
Kenya's National Grevy's Zebra Task Force





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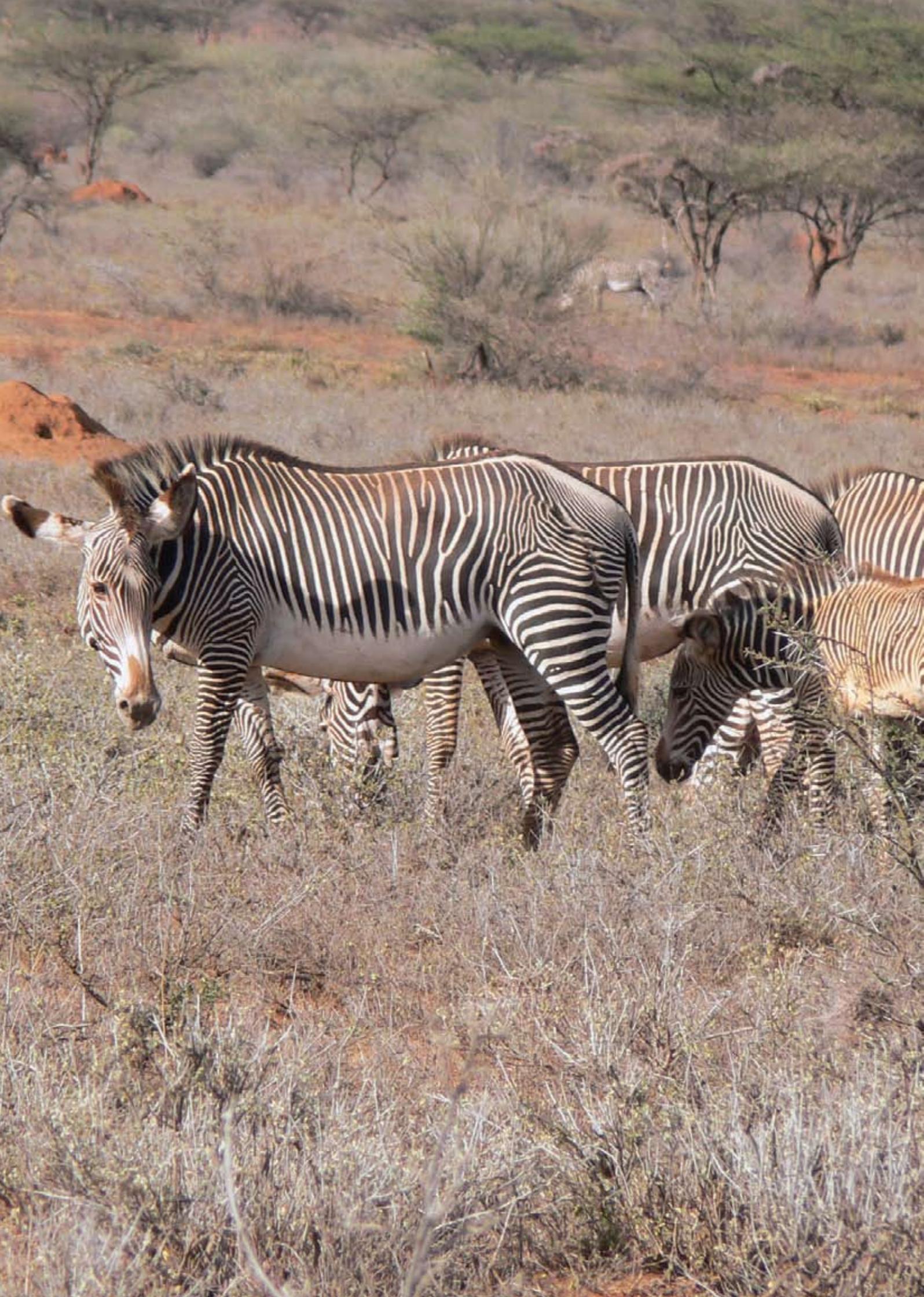


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ABBREVIATIONS

AWF: African Wildlife Foundation

CITES: Convention on International Trade in Endangered Species and Wild Fauna and Flora

GoK: Government of Kenya

GZT: Grevy's Zebra Trust

GZTF: Grevy's Zebra Task force

IUCN: International Union for Conservation of Nature and Natural Resources (now called the World Conservation Union)

KWS: Kenya Wildlife Service

LWC: Lewa Wildlife Conservancy

NRT: Northern Rangelands Trust



FOREWORD

Kenya Wildlife Service (KWS) is a state corporation established by an act of Parliament and has the legal mandate to conserve and manage wildlife in the country and enforce related laws and regulations. The functions of KWS are clearly spelled out in The Wildlife (Conservation and Management) Act CAP 376 and The Wildlife (Conservation and Management) (Amendment) Act No. 16 of 1989.

Since its inception in 1990, KWS has achieved much in curbing poaching, enlisting support in conservation, and establishing infrastructure and human capacity development. The success has been made possible through support from the Government of Kenya, international and local donors, and development partners.

The conservation and management of animal and plant species is at the core of the KWS mandate. Kenya hosts numerous wildlife species, some of which are abundant whereas others are threatened by a number of natural and anthropogenic factors. From fossil evidence and knowledge of environmental conditions that existed during the long history of wildlife, it is evident that there were far greater numbers of species and individuals in past ages than in the present time. While extinction is a natural phenomenon which occurs gradually over millennia, human activities have greatly accelerated the process. The main challenge is how to minimize human induced threats that may shorten life expectancy and hasten species extinction. To carry out our mandate effectively we need to know the status of rare and endangered species in order to formulate scientifically sound strategies to protect and build up existing populations where they persist.

Kenya is formulating a new wildlife bill listing critically endangered, threatened, vulnerable and protected species. KWS will develop and implement recovery plans for the conservation and management of all the listed species with priority to the rare, threatened and endangered species, and incorporate in each recovery plan descriptions of site-specific management actions as may be necessary to achieve desired goals for the conservation and long term survival of the species.

This national conservation strategy for Grevy's zebra was formulated to guide efforts to conserve this endangered species. KWS is committed to the realization of this strategy and calls upon donors, partners and stakeholders to support the implementation of this national conservation strategy.



Dr. Samuel Kasiki
Deputy Director,
Biodiversity Research and Monitoring
KWS



PREFACE

There is an urgent need for coordinated actions on the conservation and management of threatened species to ensure their future survival. Kenya Wildlife Service (KWS) identified the need for national species conservation strategies to ensure special attention is focused on threatened species. Consequently, KWS established the Department of Species Conservation and Management to promote threatened species conservation planning.

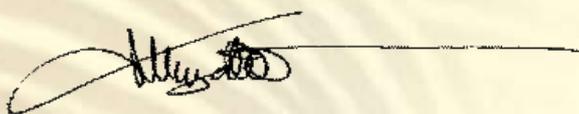
The number and populations size of Grevy's zebra have reduced drastically and the species's natural range has undergone one of the most dramatic constriction of any animal species in Africa. Today the species persists only in Kenya and Ethiopia, with over 90% of the global population found in Kenya.

The main factors responsible for the decline of the species population are loss of range, hunting, competition with domestic livestock for critical resources, loss of access to critical resources, disease and predation. The persistent decline in the species numbers and range has been of major concern to stakeholders in Kenya. Stakeholders recognised that the conservation of Grevy's zebra and its habitats will require commitment and coordinated efforts among all concerned parties to ensure the future survival of this species across its native range.

A meeting involving diverse stakeholders was held in March 2004 to map out ways of developing a conservation and management strategy for this equid species. The outcome of that meeting was the formation of a Grevy's Zebra Task Force (GZTF) to coordinate Grevy's zebra conservation efforts in Kenya. The GZTF held several meetings under the chairmanship of KWS. In its meetings following the 2004 workshop, GZTF recognised the need to develop a national Grevy's zebra conservation strategy to guide efforts to conserve and build up the remaining populations of this endangered species.

As part of the strategy development process, a national stakeholders' workshop was held in 2007 to develop a Vision, Goal and Strategic Objectives. This strategy is an outcome of this consultative and participatory process. It is a reflection of stakeholders' aspirations in Grevy's zebra conservation and there is stakeholder commitment to its implementation.

The implementation of this strategy will require resources and I would like to call upon donor organizations and stakeholders to support us so that we can actualize it and conserve Grevy's zebra for posterity.



Dr. Julius Kipng'etich
Director, Kenya Wildlife Service



EXECUTIVE SUMMARY

Grevy's zebra have undergone one of the most substantial reductions of range of any African mammal, and are found today in only two range states: Kenya and Ethiopia. Numbers of Grevy's zebra have declined from an estimate of 15,000 in the late 1970s to present-day estimates of between 1,964 and 2,445 animals representing an 84-87% decline in global numbers. The decline in Grevy's zebra is primarily the result of killing for meat, medicinal purposes or sometimes at random; loss of access to critical resources due to competition with domestic livestock; and an increasing scarcity of these resources as a result of over-exploitation.

The Grevy's zebra is listed as Endangered A1a, 2c by the IUCN/SSC Equid Specialist Group and is also listed on Appendix I of the Convention on International Trade of Endangered Species of Flora and Fauna (CITES). It is legally protected in Ethiopia and the Kenya government is currently revising its conservation status from 'Game Animal' to 'Protected Animal'.

The sustained decline in Grevy's zebra numbers and range as outlined above has been a major concern to stakeholders in Grevy's zebra conservation in Kenya. It was recognised that the conservation of Grevy's zebra and its semi-arid ecosystem in Kenya and Ethiopia will require commitment and coordination among all stakeholders to ensure the future survival of this species. This led to the formation of a Grevy's Zebra Task Force to coordinate Grevy's zebra conservation efforts in Kenya. A major output of its meetings was the need to develop a national Grevy's zebra conservation strategy to guide national and regional conservation efforts. The strategy development process has put emphasis on ensuring the participation of those taking conservation actions on the ground, particularly local communities who are the major stakeholder across the species' range.

The vision of this strategy is to have viable and sustainable Grevy's zebra populations and their habitats for present and future generations. Its goal is to mitigate the threats and reverse the decline in Grevy's zebra, and work towards fostering ecological, socio-cultural and economic sustainability within their natural range.

This vision and goal will be achieved through nine Strategic Objectives that focus on mitigating the threats to Grevy's zebra survival, increasing their numbers, and building a solid foundation upon which to sustain Grevy's zebra conservation in the long-term. These strategic objectives focus on the following areas: Coordination; Communities; Protection & Legal Status; Natural Resources; Disease; Predation, Inter-Specific Competition and Hybridisation; Capacity Building; Population Monitoring; and Strategies to Increase Numbers.

The implementing structure for this strategy is centred on site committees based on the ground in geographical units of known connected Grevy's zebra populations. The Grevy's Zebra Liaison Office established by the Kenya Wildlife Service will be the central coordinating office responsible for oversight of the strategy's implementation and acting as a critical link between stakeholders to ensure effective conservation action.



1.0 INTRODUCTION

1.1 Numbers and Distribution

Since early records of their distribution, Grevy's zebra (*Equus grevyi*) have undergone one of the most substantial reductions of range of any African mammal (Figure 1, Kingdon, 1997). Historically, Grevy's zebra were found more widely across the Horn of Africa including Djibouti, Eritrea, Somalia, Ethiopia and Kenya with a reported sighting in Sudan. Today they persist only in Kenya and Ethiopia.

Following the National Grevy's Zebra Conservation Workshop in April 2007, a map was produced by stakeholders showing a more detailed update of the distribution of Grevy's zebra across northern Kenya (Annex I).

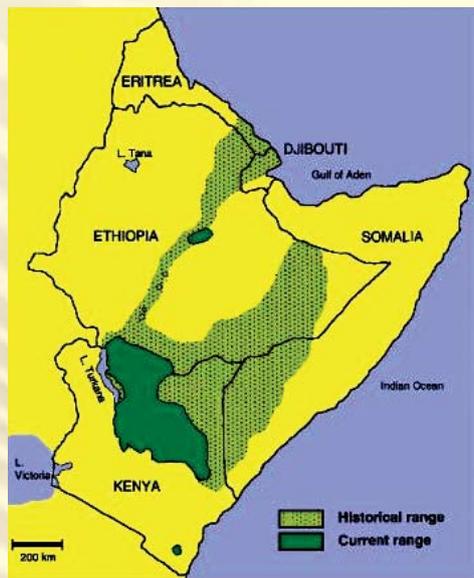


Figure 1:
Historic and present distribution of Grevy's zebra
in the Horn of Africa (data assimilated from
Kingdon, 1979, 1997; Yalden et al., 1986)

There have also been significant declines in the numbers of Grevy's zebra (Figure 2, Nelson, 2003; Rowen & Ginsberg, 1992; Williams, 2002). Towards the end of the 1970s, the global population of Grevy's zebra was estimated to be approximately 15,000 animals (Grunblatt et al., 1996; Grunblatt et al., 1989; Klingel, 1980); present-day guess-estimates are between 1,964 and 2,445 animals (Mwasi & Mwangi, 2007; Fanuel Kabede, pers comm., 2007) representing an 84-87% decline in global numbers over the past three decades.

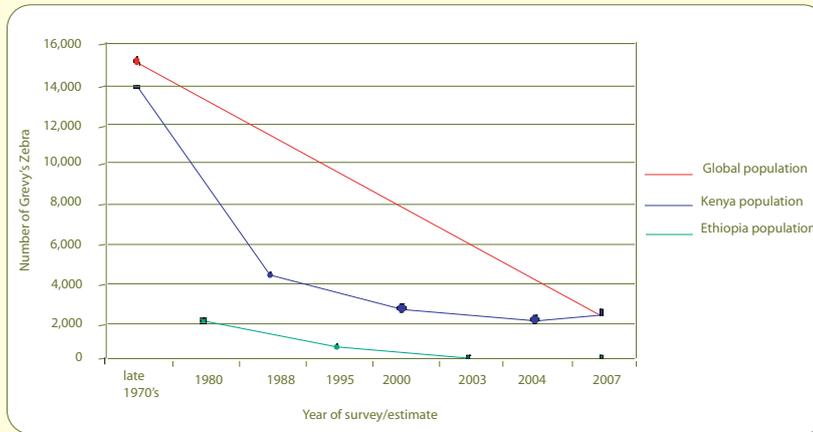
Estimates for Grevy's zebra populations in Ethiopia suggest a minimum of a 90% decline throughout the country with an estimated 1,900 animals in 1980 (Klingel, 1980); 577 animals in 1995 (Thouless, 1995) to 110 in 2003 (Williams et al., 2003). The most recent update estimated 126 Grevy's zebra remaining in Ethiopia (Fanuel Kabede, pers. comm. 2007).

In Kenya the rate of decline has been slower than that of Ethiopia. The 1977 estimate for Grevy's zebra was 13,718 (Dirschl & Wetmore, 1978); in 1988, the estimate was 4,278 (Grunblatt et al., 1989); in 2000, the estimate was 2,571 animals (Nelson, 2003; Nelson & Williams, 2003); 'guess-estimates' for Grevy's zebra in Kenya taken from the 2004 Grevy's zebra workshop (Williams & Low, 2004) range between 1,600 and 2,000 animals. In the 2007 National Grevy's Zebra Conservation Strategy Workshop (Mwasi & Mwangi, 2007) these figures were updated by stakeholders with the estimated population ranging between 1,838 and 2,319 (Annex II).



Historically, Grevy's zebra were found more widely across the Horn of Africa including Djibouti, Eritrea, Somalia, Ethiopia and Kenya with a reported sighting in Sudan.

Figure 2: Trend in Grevy's zebra numbers from the late 1970s to 2007



1.2 Conservation Status

Grevy's zebra was listed as Endangered A1a, 2c by the IUCN/SSC Equid Specialist Group (IUCN, 2003). This status is currently undergoing revision (Patricia Moehlman, Pers. Comm., 2007). Grevy's zebra is also listed on Appendix I of the Convention on International Trade of Endangered Species of Flora and Fauna (CITES) which offers them the highest protection against illegal trading. They are legally protected in Ethiopia and since 1977 have been protected by a hunting ban in Kenya. The Kenyan government is currently revising their conservation status from 'Game Animal' under the first schedule, Part II in CAP 376 of the Wildlife

(Conservation Management) Act to 'Protected Animal' (see Strategic Objective No. 3).

1.3 Threats

The decline in Grevy's zebra is primarily the result of killing for meat, and/or medicinal purposes; loss of access to critical resources due to competition with domestic livestock; and an increasing scarcity of these resources as a result of over-exploitation (Table 1, Williams, 2002; Williams & Low, 2004). In addition, there has been a significant, very recent decline in the species in northern Kenya due to disease and drought (Manyibe et al., 2006; Muoria et al., 2007).

Table 1: Summary of threats to Grevy's zebra in Kenya adapted from those listed by Williams (2002) and incorporating more recently identified threats (Njonjo, 2004; Williams & Low, 2004; Manyibe et al., 2006; Muoria et al., 2007).

Threat	Cause	Threatened population(s)
Reduction of water sources	Unsustainable extraction of perennial river water for irrigation in highland areas.	All populations, but particularly the Grevy's zebra dependent on water from the Ewaso Ng'iro river basin. This affects 60 - 70% of the population in Kenya, including the southern Laikipia, and Lewa populations.
Restricted access to water	Exclusion of wildlife from water sources by pastoral people	The small and potentially isolated populations in the more arid parts of their range, including the Laisamis, Karole, Sibilo, and El Barta populations.
Habitat degradation and loss	Heavy, sustained grazing by relatively high densities of domestic livestock resulting in changes to the vegetation communities and erosion	All lowland populations in the historic range of Grevy's zebra. Habitat loss has resulted in a large reduction in the range of Grevy's zebra.



Threat	Cause	Threatened population(s)
Competition for resources	Competition with relatively high densities of domestic livestock for limited resources, particularly in the dry season	All lowland populations of Grevy's zebra are sympatric with pastoral people and their livestock over 99.5% of their range. Potential competition may result in low juvenile survival.
Hunting	Historically, the killing of Grevy's zebra for skins; currently, killing for meat and utilisation of Grevy's zebra for medicinal and cultural purposes	Historically responsible for the large decline in Grevy's zebra numbers. At present, killing of animals for meat and medicinal purposes affects the lowland populations. Reported poaching takes place in Sibilo, El Barta, North Horr and South Horr populations.
Predation	Disproportionate predation of Grevy's zebra specifically by lion	Lewa Wildlife Conservancy and other protected areas where lions are abundant
Disease	Endemic anthrax in the environment; unvaccinated livestock making both domestic stock and wildlife susceptible to the disease especially for species occurring in low numbers.	Those populations in areas where there is a diffuse wildlife/livestock interface such as Wamba.
Inter-specific hybridisation	Sympatric hybridisation between Grevy's and plains zebra on the edge of Grevy's zebra range	OI Pejeta Conservancy and Tsavo. The extent to which this is a threat needs further investigation in both populations.

1.4 Grevy's Zebra Conservation Efforts in Kenya

Over the last ten years, conservation efforts centred on Grevy's zebra have significantly increased. It has become a focal species for many programmes, not just for wildlife conservation but also for community development because the fates of both Grevy's zebra and human livelihoods are inextricably linked to the fragile semi-arid and arid ecosystem of northern Kenya. Community-led conservation in this context has been particularly successful through the establishment and support of a growing number of community conservancies.

These communities have a lot of natural wealth and therefore conservation programmes recognise the value of assisting communities in increasing their capacity to take advantage

of the opportunities presented through the sustainable management of their natural resources and in diversifying their economic base through wildlife-based income such as tourism and game bird hunting. In addition, alternative enterprises such as aloe harvesting are currently being explored.

Focus has also been put on improving infrastructure for communities. This is important in the context of Grevy's zebra conservation particularly with respect to the development of new water sources where the distribution and management of water for domestic stock and wildlife has significant implications for Grevy's zebra. It needs to be done with great care as the presence of new water sources may allow the spread of livestock into areas that formerly were only accessible to Grevy's zebra. In addition, increasing road and air access to the more remote areas of Grevy's



zebra range will enhance the effectiveness of ongoing and new conservation programmes.

Much of the conservation work to date has targeted the populations within Samburu. There is a need to broaden this attention to other areas where Grevy's zebra continue to decline. In the Ewaso Landscape Planning Workshop in 2006 priority areas for Grevy's zebra conservation were identified (Annex III,

King & Malleret-King, 2006). Grevy's zebra range extends beyond the geographical extent of the Samburu-Laikipia landscape therefore in addition to the priorities identified during the workshop one of the outputs of this strategy will be the identification of additional target areas and agreement on the organisation/s that is/are best placed to implement conservation in that area.



Much of the conservation work to date has targeted the populations within Samburu. There is a need to broaden this attention to other areas where Grevy's zebra continue to decline.



2.0 BACKGROUND TO STRATEGY

The sustained decline in Grevy's zebra numbers and range as outlined above has been a major concern to stakeholders in Grevy's zebra conservation in Kenya. Stakeholders also recognised that the conservation of Grevy's zebra and its semi-arid ecosystem in Kenya and Ethiopia will require commitment and coordination among all stakeholders to ensure the future survival of this species across its native range (Williams & Low, 2004).

The need for a Grevy's zebra management plan for Kenya was recommended by Williams (2002). A meeting involving diverse stakeholders was held in March 2004 (Williams & Low, 2004) to map ways of developing a conservation and management strategy for the species. That meeting led to the formation of a Grevy's Zebra Task Force (GZTF) with the mandate to coordinate Grevy's zebra conservation efforts in Kenya. Since its inception, GZTF has held several meetings under the Chairmanship of the Kenya Wildlife Service (KWS). In its meetings following the 2004 workshop, GZTF decided that there was a need to develop a national Grevy's zebra conservation strategy to guide efforts to conserve this endangered species. This document is the output of that decision.

As part of the strategy development process, a national workshop was held at the KWS Training Institute between 11 and 14 April 2007 to develop a vision, goal and strategic objectives with all stakeholders in the Grevy's Zebra range. The workshop provided an opportunity to update numbers and distribution of Grevy's zebra in Kenya, as well as incorporate the inputs and views of stakeholders. Activities, indicators and timelines were outlined against each

strategic objective. Timelines for finalizing, launching and implementing the strategy and a draft implementation structure were also developed (Annex V).

2.1 Stakeholders

During the 2004 Grevy's Zebra Workshop, a list of stakeholders was drawn up (Annex IV). It was agreed that while all stakeholders were equally important, there were some stakeholders with more responsibility than others. For the purposes of this conservation strategy, it is important to highlight the role of the main groups that were identified.

Government

This refers to all levels within the Government of Kenya, including Ministries, Office of the President and Local Government. These different levels can make decisions on a range of policies and legislation that may directly or indirectly impact Grevy's zebra conservation. The Kenya Wildlife Service is ultimately responsible for the implementation and monitoring of this conservation strategy for Grevy's zebra.

Communities

Community stakeholders in northern Kenya comprise of the following ethnic groups: Samburu, Rendille, Borana, Gabbra, Maasai and Somali.

In northern Kenya, there are a growing number of community conservancies in key Grevy's zebra range now managing their land for wildlife conservation (www.nrt-kenya.org). These institutions are particularly strong because they have built real capacity in



acquiring the appropriate tools for effective conservation management. The community conservancies are therefore a primary stakeholder in the implementation of this strategy. Working through these established institutions will ultimately determine the long-term viability of the remaining Grevy's zebra population and enhance the sustainability of local and regional conservation plans for the species.

Implementing Agencies

These agencies include conservation organisations (NGOs, Fora and Trusts) that carry out Grevy's zebra conservation activities. They fundraise specifically for Grevy's zebra and implement the conservation of the species in collaboration with local partners on the ground. They also promote Grevy's zebra conservation at local, national and international levels.

Private sector

Conservancies: private conservancies hold a significant percentage of Grevy's zebra on their land and provide a more controlled environment for the management of the species to ensure that their numbers continue to increase.

Private ranches: many of the private ranches within Grevy's zebra range are located in Laikipia District. The majority of these private landowners promote and invest in wildlife conservation on their land because their financial returns are dependent on having stable wildlife populations. Thus their input into the formation of this conservation strategy and their involvement in its implementation is crucial.

Tourism sector

Stakeholders within the tourism industry include hotels, lodges, camps and tour operators that operate on private and/

or community land within Grevy's zebra range. The tourism industry is in a position to actively promote endangered species conservation to its clients. It also provides a wildlife-based income to landowners thereby supplementing the income needed for their conservation operating costs and diversifying their economic base away from pure livestock keeping.

Research/Academic Institutions

The effectiveness of this strategic plan will largely rely on having reliable information on the conservation challenges being faced in Grevy's zebra conservation. At present there are gaps in knowledge that need to be addressed for conservation to be effective and those institutions that are involved in Grevy's zebra research and monitoring therefore having a crucial role to play.

Donors

Donors include those focusing on Grevy's zebra conservation as a single species as well as those supporting community development and natural resource management which are inextricably linked to Grevy's zebra conservation.

Ethiopia

Regional collaboration between Ethiopia and Kenya is critical for the long-term conservation of Grevy's zebra, especially along the border of the two countries where Grevy's zebra range across both countries. In addition, regional collaborative initiatives are powerful for fundraising as conservation efforts are focused across the entire range of the species. One of the aims of this strategy will be to strengthen regional links with Ethiopia.



3.0 VISION AND GOAL

This strategy aims to ensure that Grevy's zebra within Kenya are conserved in the long-term. In this regard, a Vision and Goal were developed:

Vision: To have viable and sustainable Grevy's zebra populations and their habitats for present and future generations.

Goal: To mitigate the threats and reverse the declining trend in Grevy's zebra numbers,

and work towards fostering ecological, socio-cultural and economic sustainability within their natural range.

This vision and goal will be achieved through several strategic objectives that focus on mitigating the threats to Grevy's zebra survival, increasing their numbers, and building a solid foundation upon which to sustain Grevy's zebra conservation in the long-term.



The vision and goal will be achieved through several strategic objectives that focus on mitigating the threats to Grevy's zebra survival, increasing their numbers, and building a solid foundation upon which to sustain Grevy's zebra conservation in the long-term.

4.0 STRATEGIC OBJECTIVES

4.1 Coordination

An effective coordination framework will be established and operationalised in order to facilitate decision-making and identify responsibility on the conservation and management of Grevy's zebra with due consideration of the interests of all the stakeholders.

Rationale

KWS has the duty to formulate policies on conservation, management and utilisation of all wild flora and fauna in Kenya (Laws of Kenya Chapter 376, Revised 1989). KWS advises the Government and the general public on all matters relating to wildlife within Kenya. Consequently, the implementation of this strategy is the duty of KWS.

The majority of Grevy's zebra are found on community-owned lands of southern Samburu, (Williams, 2002; Nelson & Williams, 2003) the privately managed Lewa Wildlife Conservancy in Isiolo District and on the private ranches of the Laikipia Plateau. Samburu, Buffalo Springs and Shaba National Reserves are particularly important as dry season refuges for Grevy's zebra in the Samburu landscape (Ginsberg, 1988; Williams, 1998). The County Council of Samburu is responsible for the management of Samburu National Reserve while the other two reserves are managed by the County Council of Isiolo. Other Grevy's zebra populations are found in Lands which County Councils hold in trust for the local communities.

Only a negligible proportion of Grevy's zebra are found in National Parks, which

are managed directly by KWS. For KWS to effectively manage and conserve Grevy's zebra, it must work closely with diverse land owners (private ranchers, local communities and county councils). Other players who are involved in Grevy's zebra conservation include conservation organisations, the tourism industry, research and academic institutions and the donor community.

Currently, there is a limited collaboration between stakeholders involved in Grevy's zebra conservation where institutional interests have tended to supercede the interests of the species itself. To achieve the overall goal of this strategy, KWS and all the other stakeholders in Grevy's zebra conservation need to work within a well coordinated framework. During the Grevy's zebra Conservation Strategy Planning Workshop, an implementation structure was agreed upon by stakeholders (Annex V).

Activities

- i. Finalise draft of Grevy's Zebra Strategy
- ii. Launch Grevy's Zebra Strategy
- iii. Disband the GZTF and establish a Grevy's Zebra Management Committee which remains the national Grevy's zebra decision-making organ, chaired by KWS. The key stakeholder groups are represented in this organisation and meets quarterly
- iv. KWS employs a Grevy's Zebra Liaison Officer institutionally housed under KWS
- v. Establish a Site Management Committee to meet quarterly prior to the Management Committee Meetings. The Site Management Committee reports to the Management Committee and will be represented in their meetings



- vi. Establish a Grevy's Zebra Technical Committee appointed by the Director which will advise the Management Committee as needed
- vii. Develop Terms of Reference for all Committees
- viii. The Liaison Officer to coordinate centralisation of data and ensure dissemination of information to stakeholders
- ix. Identify the area and establish a KWS outpost to enhance communications for stakeholders in remote areas

Indicators

- i. The four committees proposed above are constituted and the reporting structures, responsibilities and terms of reference are set and adhered to.
- ii. Executive Committee, on behalf of KWS, will be responsible for the overall implementation of this strategy. It will meet at least twice annually but more frequently as need arises.
- iii. The National Management Committee represents all relevant stakeholders particularly members of local communities, private ranchers and local county councils.
- iv. Stakeholders share data, information, reports and publications concerning Grevy's zebra and it is centralised at KWS headquarters.
- v. Stakeholders collaborate on Grevy's zebra conservation activities to ensure minimum duplication of resources and effort.
- vi. Communities in remote areas are contactable.
- vii. Gaps in knowledge of the lesser known populations are filled.
- viii. Grevy's zebra populations increase.

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.2 Communities

Grevy's zebra conservation and management will be promoted and benefits will be enhanced through community partnerships

Rationale

The majority of Grevy's zebra populations are found in non-protected community owned lands. Communities therefore play a critical role in the conservation and management of Grevy's zebra and will ultimately determine the long-term viability of the remaining Grevy's zebra populations. They will also be critical to ensuring the success of the other listed strategic objectives.

There has been significant community goodwill, participation and improved attitudes towards Grevy's zebra conservation. However, communications and collaboration between adjacent/neighbouring communities in some Grevy's zebra areas have not been addressed and some of the land use systems in parts of the Grevy's zebras' range, such as heavy livestock densities or agricultural farming, have not been favourable to Grevy's zebra conservation. The need for education and awareness within these communities on Grevy's zebra conservation is necessary to enhance the well-being of the species and its habitat.

Communities in high competing land use practices will be encouraged to establish Conservation Areas with Grevy's zebra as a driver for ecotourism. Where this is not possible local partnerships will need to be forged and support given to addressing natural resource management particularly with respect to grazing and water.



The cost and benefits analysis of Grevy's zebra conservation to the local and wider Kenya community will be done through appropriate research. Means to promote the linkages between Grevy's zebra conservation and community development and opportunities for seeking mutually beneficial activities for the communities will be explored.

Activities

- i. Initiate income generating activities and diversifying the economic base of pastoral communities.
- ii. Increase education and awareness on conservation with emphasis on Grevy's zebra
- iii. Employ community scouts in Grevy's zebra areas for monitoring and security
- iv. Mobilize communities and communication fora with adjoining Grevy's zebra conservation areas
- v. Build Grevy's zebra conservation partnerships between communities and other relevant stakeholders
- vi. Develop and implement a method for measuring local community knowledge and attitude/good-will towards Grevy's zebra conservation
- vii. Formulate acceptable and participatory land use plans in Grevy's zebra areas
- viii. Form local community grazing management committees and formulate by-laws in Grevy's zebra conservation areas
- ix. Hold regional Grevy's zebra workshops with relevant stakeholders/communities to disseminate this strategy

Indicators

- i. Number of ecotourism projects or facilities
- ii. Increased income from enterprises
- iii. Number of workshops and barazas
- iv. Number of people/stakeholders educated on Grevy's zebra
- v. Education and awareness
- vi. Number of scouts employed and sustained
- vii. Number of new Grevy's zebra areas created

- viii. Number of communication radios
- ix. Number of new partnerships
- x. Survey tool/method developed
- xi. Number of land use plans developed and implemented
- xii. Improved land use practices
- xiii. Number of active grazing committees

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.3 Protection and legal status

Protection of Grevy's zebra will be enhanced and its legal status in Kenya upgraded

Rationale

Grevy's zebra are currently threatened by poaching both for subsistence and medicinal purposes. In areas where local people are not aware of their conservation status and where wildlife does not bring any benefits to livelihoods, Grevy's zebra are perceived as a competitor with livestock and are therefore often persecuted by local herdsman, thus displacing them from critical resources. This calls for putting into place procedures for effective prosecution of Grevy's zebra poachers which includes upgrading the legal status of Grevy's zebra in Kenya.

Illegal Killing

Historically, Grevy's zebra were persecuted for their skins – a trade which was fuelled by the demand from the fashion industry. This is believed to have led to the rapid decrease in Grevy's zebra in the 1970s.



The introduction of a hunting ban in 1977 and its listing in CITES Appendix I effectively eliminated the threat of any legal hunting in Kenya. However, the Cushite community in the Eastern part of their Kenyan range believe that Grevy's zebra meat and fat is medicinal and can be used to treat diseases like tuberculosis and gonorrhoea and have culturally hunted them for this purpose.

The Turkana ethnic community also hunt Grevy's Zebra for subsistence food. However data on the extent of this problem are not available. It is important to note that the Samburu community who dominate Samburu District have a cultural inhibition towards the consumption of Grevy's zebra or any equid's meat. This probably explains their persistence in much of the Samburu landscape. Ongoing research on movements indicates that these animals move to and from areas in which they could potentially be hunted. There is an urgent need to investigate the extent of hunting particularly in areas occupied by the specified ethnic communities.

Gaps in Knowledge

Although there is lot of interest in the future of Grevy's zebra, most of the detailed studies on this species have taken place on the populations in Lewa Wildlife Conservancy, Samburu and Buffalo Springs National Reserves and the community areas west of the Ewaso Ng'iro River (Ginsberg, 1988; Rowen & Ginsberg, 1992; Williams, 1998; Rubenstein et al., 2004; Kirathe et al., 2005; Low et al, 2005; Muoria et al., 2005; Kivai, 2006; Muoria et al., 2007). However very little attention has been paid to the Grevy's zebra populations in Isiolo District of Kenya despite unconfirmed reports that there could be subsistence poaching in the area.

In the 2000 census, the number of Grevy's zebra in Samburu, Buffalo Springs and Shaba reserves was 603 (Nelson & Williams, 2003). Currently, the number of Grevy's zebra encountered in these areas rarely exceeds 150 (Muoria 2004; Manyibe et al., 2006). The reserves could be serving as sources of Grevy's zebra but the community areas east of the reserves are sinks whereupon dispersal to the east of the reserves, Grevy's zebra are poached.

Similarly the more remote populations of Grevy's zebra north of Wamba, such as in Sibilo, El Barta, North Horr and South Horr need further attention where poaching has been reported to occur (Woodfine et al, 2005).

Security

The role of communities in wildlife policing should be emphasized. Past and ongoing work indicates that the majority of Grevy's zebra utilize community-occupied land and populations in protected areas regularly disperse between the protected and community areas. It is therefore necessary to equip local communities with the capacity to ensure the security of Grevy's zebra and other wildlife. Grevy's zebra populations within the Samburu landscape are currently benefiting from the rapid evolution of community conservancies which have a network of community scouts.

KWS will continue to maintain or re-establish an effective deterrence through sufficient presence in or support to Grevy's zebra conservation areas and through promotion and implementation of appropriate legislation, which is likely to emerge from the pending amendments to the Wildlife Act and new Wildlife Policy.



It is important to note that the Samburu community who dominate Samburu District have a cultural inhibition towards the consumption of Grevy's zebra or any equid's meat.

Improved Livelihoods

Within pastoral communities, hunting wildlife is often the result of poverty due to a reliance on livestock which does not provide a consistently stable economic base. Opportunities for alternative income generation exist, but the capacity of communities to access that knowledge and the resources required to develop these opportunities is limited. The community conservancy model that is rapidly expanding in northern Kenya provides an opportunity through which to strengthen the capacity of communities and diversifying their livelihoods (www.nrt-kenya.org). This approach is significant in the context of protecting Grevy's zebra into the future as communities receive the economic benefits brought through active wildlife conservation.

Activities

- i. Monitor survival and movements of Grevy's zebra East Samburu/ Buffalo Springs and Shaba national reserves
- ii. Monitor survival and movements of the more remote Grevy's zebra populations in the north
- iii. Monitor the status of Grevy's zebra on private land
- iv. Increase Grevy's zebra awareness among communities in Grevy's zebra range
- v. Formation of local community scout programme in areas with significant population of Grevy's zebra and equip them with relevant security training, monitoring and radio communications equipment so they can work with KWS and other security agents.
- vi. Support Community Conservancies to diversify their economic base and promote the generation of wildlife-based income
- vii. Within communities that utilise Grevy's zebra for treating tuberculosis work with traditional healers and the public health sector to facilitate access to diagnosis and treatment for the disease with conventional drugs by training community Para-nurses
- viii. Upgrade the legal status of Grevy's zebra in Kenya.

Indicators

- i. A better understanding of Grevy's zebra movement and survival in areas East of Samburu/ Buffalo Springs/ Shaba Complex and of those remote populations further north
- ii. A better understanding of the status of Grevy's zebra on private land
- iii. An intelligence report (by KWS) confirming whether Grevy's zebra poaching takes place in areas occupied by communities which culturally consume equid meat
- iv. Decrease in persecution of the species
- v. Decrease in poaching incidents for meat and medicinal properties
- vi. Reports on suspected Grevy's zebra poaching which are investigated, documented and followed up
- vii. Presence of Grevy's zebra community scouts in areas with significant Grevy's zebra populations
- viii. Improved Grevy's zebra survival leading to an increase in Grevy's zebra numbers.
- ix. The legal status of Grevy's zebra in Kenya upgraded to Protected Species.

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.4 Natural resources

Viable natural habitat and access to critical resources for Grevy's zebra will be secured, managed and enhanced

Rationale

Over-exploitation and monopolisation of resources across Grevy's zebra range and the resulting competition with domestic livestock remain a critical conservation challenge



(Kingdon, 1997, Williams, 2002, Williams & Low, 2004). Securing grazing and water resources and addressing the escalating land degradation in northern Kenya are critical to the long term survival of the species.

Access to water

Exclusion from water sources by pastoral people has been identified as a serious threat to successful recruitment into Grevy's zebra populations (Nelson & Williams, 2003; Rowen, 1992; Williams, 1998). Because lactating females must drink water daily (Becker & Ginsberg, 1990; Ginsberg, 1989), in areas of high livestock density the resulting monopolisation of water sources by livestock forces lactating females to graze further from water (Nelson & Williams, 2003). As a result of moving considerable distances to access water, and often at night, foal and juvenile survival is lower as the risk of predation increases at night (Williams, 1998) and the distances travelled may place physiological stress on foals (Rubenstein, 1986). Since foals are the weak link in the life cycle of Grevy's zebra, targeting access to resources that are required by lactating females is critical for enhancing foal survival and improving recruitment rates into populations (Williams, 1998; 2002).

It will be critical to maintain water sources that are not used by other communities who have no link to conservation. For example, springs within the core range of Grevy's zebra (including communities and the National Reserves) can easily be cared for and protected against over-exploitation. In addition to enhancing access to and conserving local water sources, a broader focus is needed on addressing the over-exploitation of the Ewaso Ng'iro River for highland irrigation. Some 60-70% of Kenya's Grevy's zebra population rely on this river basin.

Therefore its long-term health is critical (Williams, 2002). Degradation and loss of habitat and competition with livestock

To date, attempts at land regeneration in the Grevy's zebra range of northern Kenya have largely failed. With an increasing human population there may be a parallel increase in livestock numbers. Therefore research focusing on ecosystem ecology that incorporates climate, soils, primary productivity, herbivory and predation is required to shed light on these issues. It may be appropriate to introduce Holistic Management of land, an approach that takes advantage of the high densities of livestock and uses them as a tool for restoring health to degraded land (Savory & Butterfield, 1999). At the same time, the initiation of a community livestock programme such as that being implemented by the Northern Rangelands Trust (NRT, 2005) will provide access to livestock markets and diversification of livelihoods thus complementing the mutual aims of improving livestock condition without increasing numbers, and controlling grazing for the benefit of the wildlife and its range.

Activities

- i. Identification and conservation of breeding hotspots for Grevy's zebra
- ii. Establishment of livestock-free core conservation areas within Community Conservancies
- iii. Incorporate holistic grazing planning in rangeland management
- iv. Develop incentives for local communities to promote Grevy's zebra conservation on their land
- v. Empowerment of local Community Conservancies to incorporate Grevy's zebra in their conservation plans
- vi. Provide logistical support to established grazing committee and encourage establishment of new ones



It may be appropriate to introduce Holistic Management of land, an approach that takes advantage of the high densities of livestock and uses them as a tool for restoring health to degraded land (Savory & Butterfield, 1999).

- vii. Explore the possibility of developing suitable rangeland conditions through soil and water conservation and reseedling
- viii. Promote and strengthen community tourism initiatives and other wildlife or natural resource-based income
- ix. Address the Ewaso Ng'iro off-take for highland irrigation with appropriate partners
- x. Promote water catchments rehabilitation and conservation

Indicators

- i. A map of Grevy's zebra ranging areas and breeding hot spots is developed
- ii. An inventory of degraded areas is made
- iii. Age structure within Grevy's zebra sub-populations improves indicating increased foal and juvenile survival
- iv. Within identified breeding hotspots, Grevy's zebra lactating females travel shorter distances and have diurnal access to water sources
- v. Policies controlling water extraction from the Ewaso Ng'iro river basin are developed and enforced so that the Ewaso Ng'iro remains a perennial river
- vi. Health of rangelands is improved with an increase in grass cover and quality leading to a more effective water cycle through optimal use of rainfall
- vii. Grazing committees are motivated and empowered to control the movement and distribution of community livestock through the development of formal by-laws
- viii. Conservation and development plans of Community Conservancies incorporate the needs of Grevy's zebra
- ix. Development organisations focused on the needs of communities work through Community Conservancies and their conservation partners to ensure that development and conservation plans are complementary and mutually reinforcing
- x. Acreage re-afforested increased
- xi. Enforcement of water act
- xii. Water flow beyond Archer's Post improves on the Ewaso

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.5 Disease

Disease outbreaks that threaten Grevy's zebra survival will be minimised and effectively addressed

Rationale

The outbreak of anthrax in the Wamba area of northern Kenya between December 2005 and March 2006 (Manyibe, et al., 2006) highlighted the importance of developing a preparedness and action plan to address disease outbreaks in wild populations of Grevy's zebra. There is very little information on disease and epidemiology in free ranging Grevy's zebra. This information is needed to properly assess the role of disease in Grevy's zebra population dynamics.

Preventing outbreaks is preferable to treating them, both in terms of the high cost of mobilising resources to vaccinate wildlife and the losses of wildlife and livestock incurred when outbreaks are severe. Where the interface between livestock and wildlife is diffuse, such as in northern Kenya, it is recommended that annual vaccinations of livestock against diseases such as anthrax are undertaken (Roy Bengis, Pers. comm.). In the long-term, the recurring annual expense of vaccinating livestock should be incorporated into the conservation plans for Grevy's zebra. In particular this activity should be focused on livestock in areas of high Grevy's zebra density such as Wamba.



Addressing land degradation in northern Kenya as highlighted in Strategic Objective No. 4.4 is another long-term measure that will help to minimise disease outbreaks such as anthrax. Increased grass cover will reduce the risk of animals ingesting spores from exposed soil during periods of drought.

Activities

- i. Elect a small and effective Disease Response Committee (DRC) out of the existing Grevy's Zebra Task Force with representation of the following sectors: livestock veterinarian, wildlife veterinarian, public health, disease diagnosis, and mortality and disease surveillance and data collection. A Coordinator should be elected to be responsible for overall coordination of the activities of different sectors in the event of a disease outbreak.
- ii. Activate an international Disease Response Listserv of Grevy's zebra stakeholders and disease experts to be managed by the DRC Coordinator so that all stakeholders are kept updated on progress and expertise can be sought via email/internet.
- iii. Refer to the Preparedness and Action Plan for Disease Epizootics in Grevy's Zebra Range developed by the Grevy's Zebra Task Force (in preparation).
- iv. Administer annual vaccination boosters to livestock against anthrax and other infectious diseases in Grevy's zebra hotspot areas.
- v. Maintain long-term surveillance of anthrax and other relevant diseases.
- vi. Collect blood samples from all immobilised Grevy's zebra for routine disease testing.
- vii. Collect blood or tissue samples from Grevy's zebra carcasses where cause of death is unknown.

- viii. Establish an emergency fund that can be used to mobilise teams in the event of future disease outbreaks.
- ix. Identify existing Frontline Animal Health Workers (Para-vets, Animal Health Advisors & Animal Health Technicians) for sampling and other veterinary aspects in Grevy's Zebra range
- x. Train community Para-vets in Grevy's zebra range
- xi. Maintain a list of potential Grevy's zebra diseases and their symptoms
- xii. Distribute guidelines for carcass management in Grevy's zebra range (wildlife and livestock)
- xiii. Initiate epidemiological research on disease in Grevy's zebra range
- xiv. Procure diagnostic equipment and establish a diagnostic lab.

Indicators

- i. A Preparedness and Action Plan for Disease Epizootics in Grevy's Zebra Range is developed and provides practical guidance in the event of disease outbreaks
- ii. Disease outbreaks are detected early so that potential spread of diseases is controlled
- iii. Response to outbreaks is well-coordinated and resources efficiently utilised
- iv. Grevy's zebra deaths as a result of disease are minimised
- v. Livestock in Grevy's zebra hotspot areas are vaccinated against anthrax
- vi. Potential diseases threatening Grevy's zebra are identified and understood
- vii. Para-vets are identified and trained

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.



Increased grass cover will reduce the risk of animals ingesting spores from exposed soil during periods of drought.

4.6 Predation, inter-specific competition and hybridisation

Other wild species that threaten the survival of Grevy's zebra within areas identified as critical to the overall conservation of the species will be managed appropriately

Rationale

Although predation and competition with sympatric species are natural components of Grevy's zebra evolutionary history, there is potentially need to intervene in some areas due to the low numbers of Grevy's zebra.

Predation

Predation by lions may be having a significant impact on Grevy's zebra numbers at Lewa Wildlife Conservancy (King & Malleret-King, 2006; Njonjo, 2005; Rubenstein, 2004; Rubenstein et al. 2004) and in community areas within the Samburu landscape (King & Malleret-King, 2006; Muoria, Pers. Obs.). Ongoing predator research in the Samburu landscape indicates predation by lions may be one of the limiting factors in Grevy's zebra population dynamics.

Lions are classified as Vulnerable (www.iucn.org/redlist) by the IUCN Red List. They do well in protected areas but poorly outside (Woodroffe, 2001). In addition, lions have a very high value in the tourism industry (Lindsey et al, In press). It is therefore very important that accurate information be obtained on the contribution of lions to the decline of Grevy's zebra populations before any action to reduce the lion numbers is taken. The level of lion predation in Samburu, Buffalo Springs and Shaba national reserves is not

currently known and should be determined as soon as possible. Lions could be turning to Grevy's zebra due to a low number of other prey species. It is therefore also important to establish the numbers and population status of other prey species within the Grevy's zebra range.

Competition

Grevy's zebra may compete for resources with other wild animals. In particular this may occur in areas where plains zebra (*Equus burchellii*) are in higher density than Grevy's zebra (Rubenstein, 2004; Rubenstein et al. 2004). This competition may occur on the Lewa Wildlife Conservancy and possibly in the Kisima area. It is therefore important to monitor the population size and status of plains zebra in such areas. In areas where such research is already taking place, it will be necessary to work with the site researchers to obtain relevant data and compare it with Grevy's zebra population size and status. In case it is shown that plains zebra are limiting the population of Grevy's zebra, then the removal of some plains zebra may be considered.

Inter-specific Hybridisation

A zebra hybrid is the term used for a zebra crossed with any other equid species (Benirschke, 1977; Breen & Grill, 1991; Bennett, & Foster, 1987). Sporadic inter-specific hybridisation between sympatric species can occur in a situation where one species is faced with a shortage of conspecific mates but has access to hetero-specific mates (Detwiler et al. 2005). This type of mate shortage can occur at the edge of a species' range or in situations where a species has been introduced to an area but has not increased in numbers to sufficient post-introduction. Hybridisation between a common species and an endangered species

Grevy's zebra may compete for resources with other wild animals. In particular this may occur in areas where plains zebra (*Equus burchellii*) are in higher density than Grevy's zebra (Rubenstein, 2004; Rubenstein et al. 2004).



can increase the level of threat faced by the rarer species where the endangered parent population can be genetically swamped.

Grevy's zebra reproductive males are territorial and mate with receptive females which are attracted to their territories; plains zebra reproductive males maintain a harem of reproductive females which stay together. These behavioural differences were thought to prevent the two species from interbreeding in their natural habitat. However, Grevy's-plains zebra hybrids with apparently fertile offspring have been observed in the OI Pejeta Conservancy (Cordingley & Rubenstein, 2006) and in Taita Ranch. Grevy's zebra were introduced into Tsavo during the 1980s (Williams, 2002) and it is therefore likely that hybridisation was anthropogenic as a result of introducing them to an area outside their historical range. Because this hybrid population is geographically separated from potential Grevy's zebra parent populations, it probably does not pose a threat. OI Pejeta Conservancy, on the other hand, lies at the southern edge of the species' range following an expansion of range by Grevy's zebra further south probably as a result of habitat loss experienced in the lowland areas (Williams, 2002). This situation could be considered both natural and anthropogenic since the cause of range expansion by Grevy's zebra was probably the result of human interventions in the landscape further north.

In both situations, the density of plains zebra far exceeds that of Grevy's zebra. The OI Pejeta Conservancy population of Grevy's zebra has a sex ratio skewed towards males suggesting that Grevy's zebra breeding males lacked conspecific females to mate with and probably resorted to mating with plains zebra females.

The dynamics of the Tsavo population are currently not known and need investigation. In the context of Grevy's zebra conservation, it is important to determine the cause and extent of hybridisation that has occurred in both areas and specifically whether this process is likely to further endanger Grevy's zebra, particularly in Laikipia District where Grevy's zebra are becoming more abundant and therefore the potential for hybrids to mix with the parent population is greater.

Activities

- i. Monitor plains zebra population size and structure in relation to Grevy's zebra in areas where plains zebra density is significantly higher
- ii. Support and expand ongoing research on the impact lion and other carnivore predation have on Grevy's zebra population dynamics in collaboration with the predator working group.
- iii. Determine the lion population size and structure in the National Reserves within the Grevy's zebra habitat and the level of predation on Grevy's zebra
- iv. Establish the population sizes of other potential prey species particularly in the protected areas
- v. In conservancies, reduce number of lions if there is sufficient data to prove that lions are significantly limiting Grevy's zebra numbers
- vi. Support ongoing research into hybridisation so that informed decisions can be made on how to address the issue and remove current hybrids.
- vii. Develop clear guidelines on how to best handle the issue of hybridisation and intervention mechanisms in the event of hybridisation.



The OI Pejeta Conservancy population of Grevy's zebra has a sex ratio skewed towards males suggesting that Grevy's zebra breeding males lacked conspecific females to mate with and probably resorted to mating with plains zebra females.

- viii. Draw up and implement natural resource management plans for protected areas within Grevy's zebra range. Of the key national reserves in the Grevy's zebra range, only Samburu National Reserve has such a management plan

Indicators

- i. Avail data on the population size and structure of plains zebra in areas where they overlap with Grevy's zebra
- ii. Secure data on the population size and structure of other prey species
- iii. Secure data on the level of lion predation on Grevy's zebra in protected areas
- iv. Secure data on the dynamics and threat level of hybridisation
- v. Following management interventions, there will be an increase in Grevy's zebra numbers in areas where they may be currently affected by these factors

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.7 Capacity building

Develop a sustainable resource and management capacity amongst Grevy's zebra stakeholders

Rationale

The recovery of viable Grevy's zebra populations in their natural range is of great concern to Kenya. The survival of the remaining population and its enhancement is dependent on intensive protection and active biological management. These forms of management require adequate and well trained human capital.

Relevant training programmes for all stakeholders and particularly personnel involved in Grevy's zebra management are required. Adequate and sustainable funds for all necessary operational costs, infrastructure and monitoring equipment are needed.

Development of human capacity and availability of financial resources is therefore crucial for the successful implementation of this strategy. Efforts will be made to raise funds for Grevy's zebra conservation related activities as well as allocating the funds on a priority basis.

Activities

- i. Review and assess training needs
- ii. Carry out appropriate training based on the training needs assessment
- iii. Develop standardized training manuals for the monitoring scouts
- iv. Set up a sustainable training of trainers
- v. Develop Terms of Reference for community scouts
- vi. Increase numbers of local technical personnel (scientists) within Grevy's zebra conservation and management
- vii. Build conservation expertise in communities
- viii. Identify and procure equipment and infrastructure requirements

Indicators

- i. Training needs assessment done
- ii. Number of training sessions
- iii. Number of trained, qualified personnel
- iv. Manuals developed based on existing standardised Grevy's zebra monitoring methodology
- v. Terms of Reference developed based on real working models
- vi. Capacity of communities to train others is built
- vii. Number of local technical personnel increases



- viii. Capacity and knowledge of communities to implement conservation increases
- ix. Access to Grevy's zebra areas is enhanced
- x. Conservation programmes more easily facilitated

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

- iii. Map areas where each organization is monitoring Grevy's zebra
- iv. Identify current monitoring methods in use per area
- v. Develop a standardized method for a national census including time of year, identification of counting blocks, responsible organisations and prioritisation of areas that require more intensive monitoring in between census years.

4.8 Population monitoring

Monitoring methods to determine numbers, distribution, and population status and threats to Grevy's zebra populations in Kenya will be established, enhanced and implemented

Rationale

Regular national Grevy's zebra censuses are needed to establish good baseline data on population distribution and numbers. These data are needed to accurately assess and prioritise appropriate actions for Grevy's zebra conservation. Coordination of all personnel that will be involved in the census is critical to achieve full coverage of the Grevy's zebra range. The establishment of standardized methods will make it possible to more accurately assess Grevy's zebra population numbers throughout the range and through time. A national census should be conducted every five years. Intensive monitoring of some populations needs to continue and should be expanded to other areas.

Activities

- i. Map currently known Grevy's zebra distribution in Kenya
- ii. Map known movements of Grevy's zebra

Indicators

- i. GIS map of currently known distribution of Grevy's zebra in Kenya
- ii. GIS map of areas where each organization is monitoring
- iii. GIS map of known Grevy's zebra movements
- iv. Meeting to establish standardised census methods
- v. First national census undertaken and report produced
- vi. National census every five years and census reports
- vii. Areas identified for extended monitoring

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.

4.9 Strategies for increasing numbers

Strategies to enhance the survival and increase numbers of Grevy's zebra will be explored and developed

Rationale

It is essential to diversify the management models being applied to Grevy's zebra conservation so that all options for increasing their numbers within their natural range are considered. One model that has not been fully explored



Coordination of all personnel that will be involved in the census is critical to achieve full coverage of the Grevy's zebra range.

is the establishment of populations protected against excessive livestock and predation pressure so that survival and breeding capacity are enhanced. Targeting foal survivorship will directly enhance the survival of the species and will increase numbers to provide surplus animals for restocking other areas.

Such populations would act as a source for augmenting low densities of Grevy's zebra in areas of their natural range once the in-situ threats have been addressed. For example, some areas within the existing range of Grevy's zebra will be in a position to receive translocated animals over the next five years as their security and natural resource management systems are enhanced.

It is critical that these populations are located within existing Grevy's zebra range to maximise the chances of successful breeding and to ensure that management of the breeding population is made easier and more cost-effective by its proximity to other individuals of the species.

Activities

- i. Develop a protocol with clear guidelines on the establishment of breeding populations within Grevy's zebra range taking into consideration minimum population size, sex ratio, habitat types, translocations and predator naivety
- ii. Explore the potential of establishing a small breeding population
- iii. Partner with zoological institutions to enhance management
- iv. Augment existing populations in Grevy's zebra range with individuals born from the protected populations.

Indicators

- i. Populations are successfully reproducing to provide surplus animals for restocking
- ii. Genetic diversity within populations remains healthy
- iii. Successfully breeding populations provide a source in the long-term for translocation to enhance existing populations in other areas

The proposed Actions, Targets, Timeframes and Responsibilities for this strategic objective are given in Annex VI.



One model that has not been fully explored is the establishment of populations protected against excessive livestock and predation pressure so that survival and breeding capacity are enhanced.



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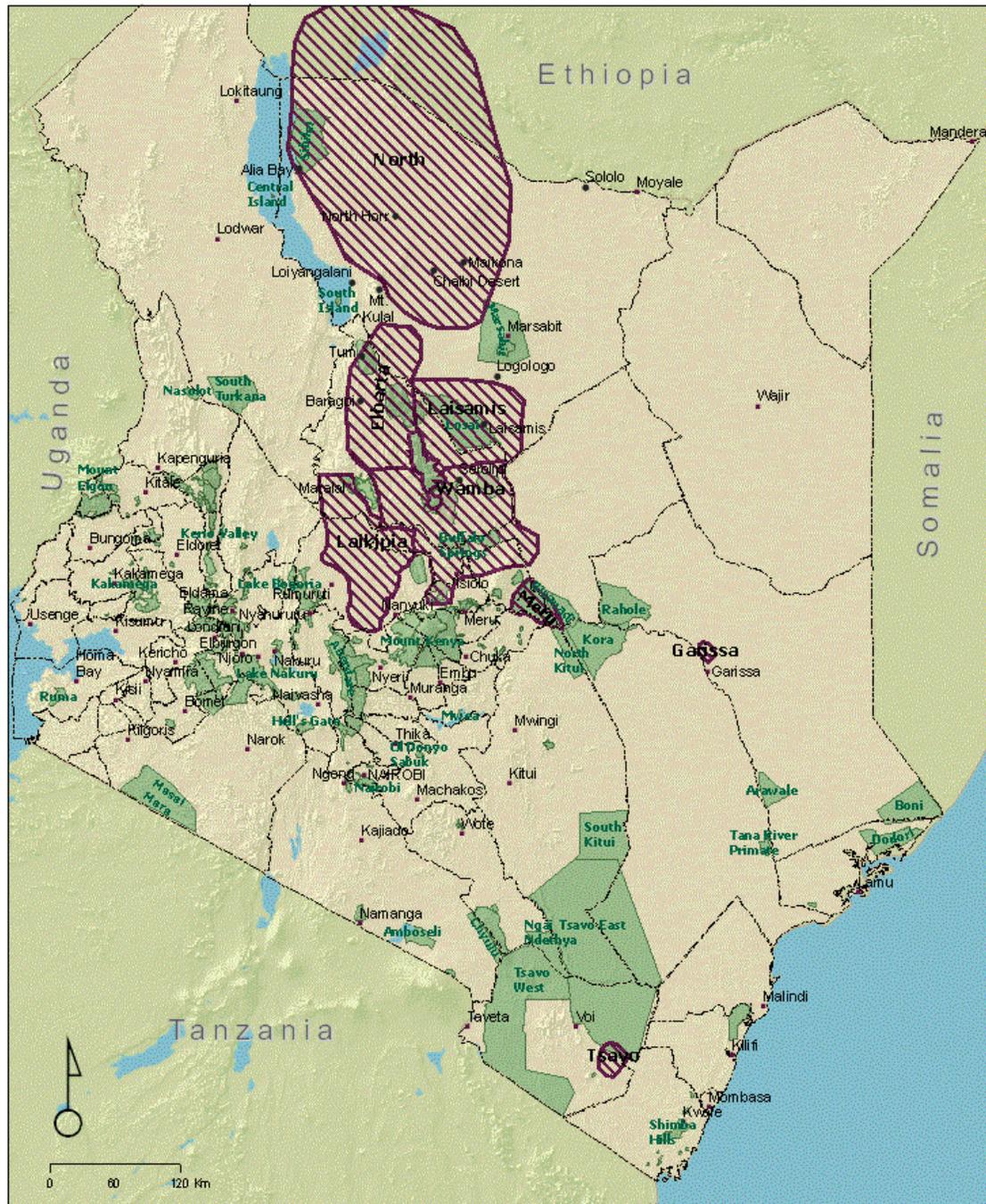
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6.0 ANNEXES

Annex I: Key Grevy's zebra conservation zones



Key Grevy Zebra Zones

- Towns
- ▨ Grevy Zebra Zones
- Lake
- Protected Areas
- Districts

Source:
Grevy Zebra Conservation Strategy Stakeholders
ESRI-USGS, Survey of Kenya,

AWF Spatial Analysis Lab
May 2007



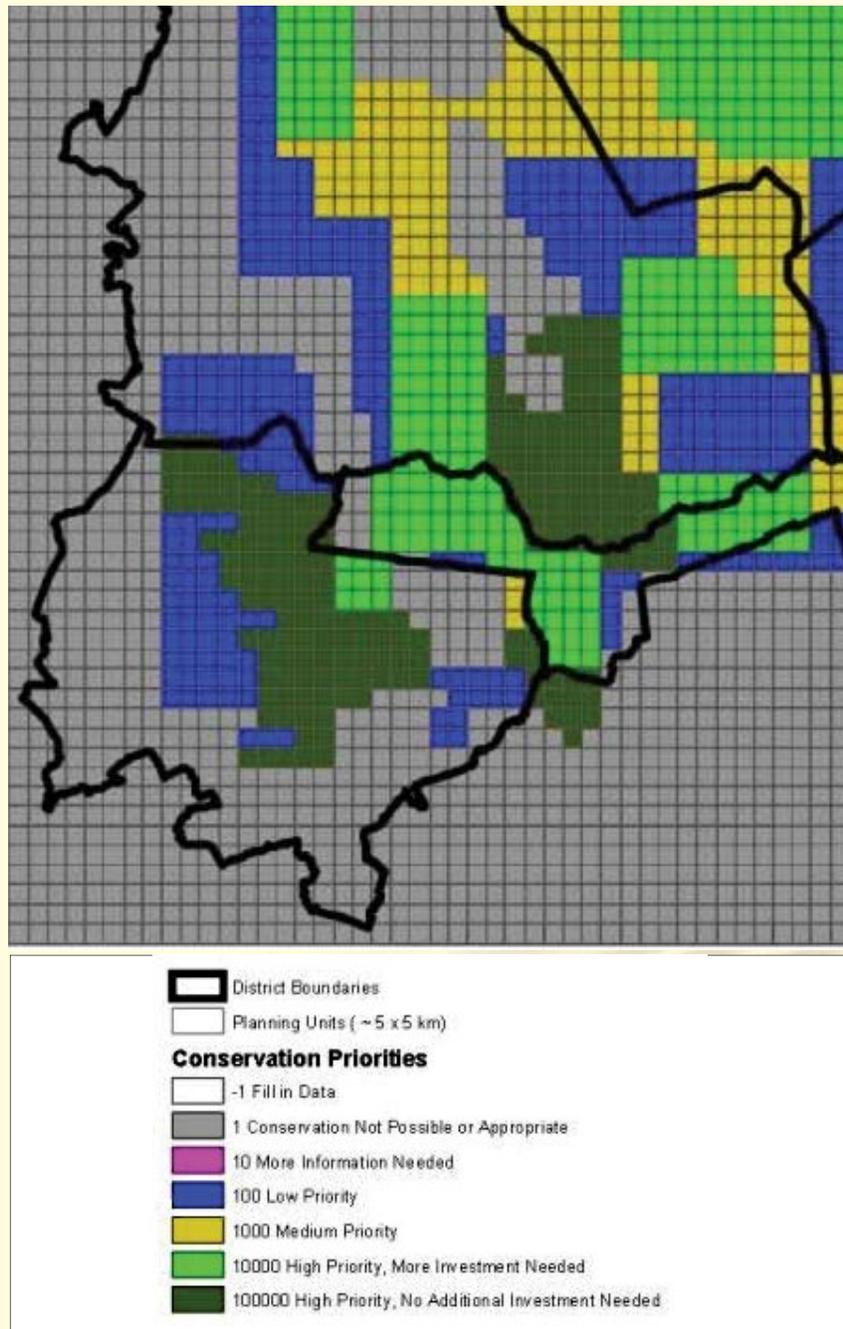
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Annex II:

The 2000 census of Grevy's zebra in northern Kenya is compared with the 'guess-estimates' made by the participants of the 2004 Grevy's Zebra Conservation workshop (Williams & Low, 2004) and guess-estimates from the 2007 Grevy's Zebra Strategy Workshop (Mwasi & Mwangi, 2007).

Area Name	2000 Census		Guess-estimates from GZ Conservation Workshop			Guess-estimates from GZ Strategy Workshop 2007				
	Total		Min	Max		Min	Max	Point of contact for estimates	Confidence level	
Lewa Wildlife Conservancy	536	425		425		430	430	Lewa	High	
LMD	105	10		15		20	20	Lewa, AWF	Low	
Buffalo Springs/Samburu/Shaba	603							AWF, NRT, GZT		
Longopito (including Kipsing)	157	610		900		527	764	Reserves, Conservancies	Med	
Barsalinga	13									
Nagorogoro	358									
Kula Mawe						40	40	AWF, Reserves	Low	
Iresaboru (East of Shaba)						40	100	AWF, Reserves	Low	
Laisamis (all Laisamis surrounds)	101	100		100		200	200	Melako	Med	
Ilaut						30	30	GZT	Low	
Karare (Karoole)	66	60		100		50	100	GZT	Low	
Kalacha	30	0		0		10	10	GZT	Low	
Seberei	93	21		21		4	10	GZT	Low	
Sibitoi	16	25		25		4	4	KWS	Med	
Baragoi (El Barta plains to Barsaloi)	26	5		10		20	80	GZT	Med	
North Horr						-	-	GZT	Low	
South Horr						13	13	GZT	Low	
C. Laikipia	213	200		200		190	200	Dr Rubenstein	Med	
N. Laikipia	194	?		?		190	200	AWF	Low	
Gariisa	57	4		70		4	20	KWS	Med	
Serolevi, Laesororo & Ndongyo Wasin	N/A	70		50		40	40	NRT	Med	
Tsavo East & Taita	N/A	17		50		18	50	KWS	Med	
Meru	3	20		30		8	8	KWS	High	
Totals	2571	1567		1996			2319			

Annex III: Map showing Grevy's zebra conservation priorities identified by stakeholders during the Ewaso Landscape Planning Workshop (King & Malleret-King, 2006)



Annex IV:

Stakeholders in the conservation of Grevy's zebra and their semi-arid ecosystem (Williams & Low, 2004). For the purpose of this strategy, the table has been updated to include additional stakeholders (highlighted in italics).

Kenya Government	Community	Wildlife NGOs, Fora & Trusts	Private	Tourism (Community & Private)	Research & Academic Institutions	Donors
<u>Ministries</u>	Group Ranches	Lewa Wildlife Conservancy	Private	Hotels & Lodges	Universities	Zoos
Ministry of Environment & Natural Resources & Wildlife	Samburu	African Wildlife Foundation	Ranches	Tour Operators	Colleges	Foundations
Ministry of Livestock	Somali	Laikipia Wildlife Forum			Mpala Research Centre	Private Trusts
Ministry of Forest and Wildlife - Kenya Wildlife Service	Borana	Samburu Wildlife Forum			National Environment Management Authority	
Ministry of Lands & Settlement	Turkana	Northern Rangelands Trust			Scientists	
Ministry of Agriculture	Gabbara	<i>Ewaso Conservation Group</i>			Earthwatch Institute	
Ministry of Education,	Rendille	<i>Milgis Trust</i>			National Museums of Kenya	
Ministry of Science & Technology	<i>Mukogodo</i>	<i>Grevy's Zebra Trust</i>			Lewa Wildlife Conservancy	
Ministry of Water Management & Irrigation	<i>Maasai</i>				Technical Advisory Groups	
Ministry of Development of Northern Kenya - <i>Ewaso Ngiro North Development Authority</i>	Community Based Organisations				IUCN/SSC Equid Specialist Group	
Members of Parliament	<i>Community Conservancies</i>				<i>Save The Elephants</i>	
<u>Office of the President</u>					<i>Princeton University</i>	
Police					<i>Marwell Preservation Trust</i>	
Provincial Administration						
Department of Defence (British Army)						
<u>Local government</u>						
Samburu County Council						
Isiolo County Council						
Marsabit County Council						
<i>Laikipia County Council</i>						

Annex IV (continued)

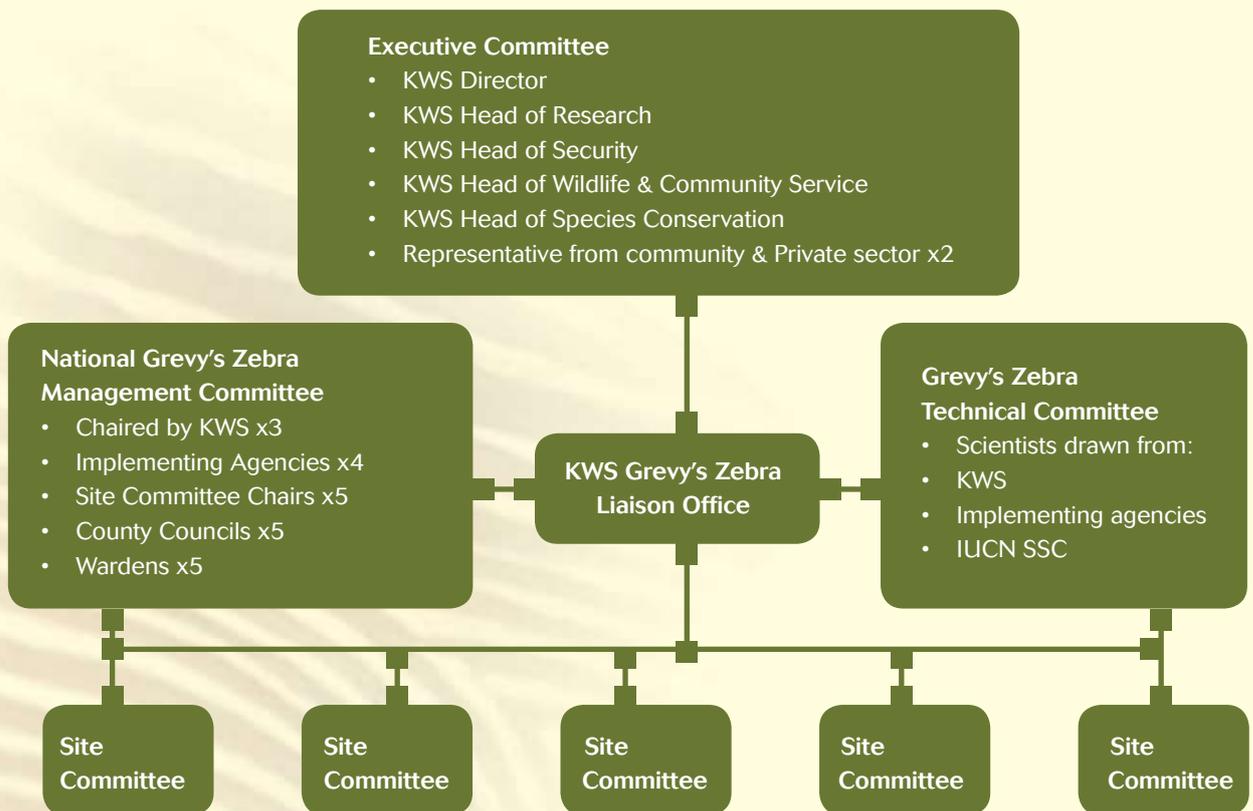
Kenya Government	Community	Wildlife NGOs, Fora & Trusts	Private	Tourism (Community & Private)	Research & Academic Institutions	Donors
<u>Office of the President</u>						
Police						
Provincial Administration						
Department of Defence (British Army)						
<u>Local government</u>						
Samburu County Council						
Isiolo County Council						
Marsabit County Council						
<i>Laikipia County Council</i>						



Annex V:

Implementing Structure for Grevy's Zebra Conservation Strategy

This structure focuses on forming Site Committees based on the geographical units of known connected Grevy's zebra populations in northern Kenya. These are; Wamba, Laisamis, El-Barta, Laikipia and the North (see Annex 1).. The Chair of each Site Committee then has a seat on the National Grevy's Zebra Management Committee. By having geographically discrete committees, fair representation will be achieved across Grevy's zebra range, and meetings will be more productive and logistically feasible by having smaller groups that meet in-situ. It is likely that different sites will be addressing different threats so conservation action within sites may vary. In addition, conservation targets within each site will be more effectively measured because it is proposed that Grevy's zebra census efforts focus on counting Grevy's zebra populations within each site (census methods are likely to vary based on distribution, numbers and terrain). Each Site Committee would be facilitated and supported by affiliated implementing agency/ies.



Annex VI:

Grevy's zebra conservation strategy implementation action plan

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Coordination	Final draft of Grevy's Zebra Strategy	Stakeholders agree and adopt Grevy's Zebra Conservation Strategy	All	May 2007	Head of Species, KWS
	Launch Grevy's Zebra Strategy	Ministry responsible for wildlife conservation ratifies the Grevy's Zebra Conservation Strategy	All	June 2008	Head of Species, KWS
	A Grevy's Zebra Management Committee is established	Management Committee is constituted and reporting structures, responsibilities and terms of reference are set and adhered to	All	30 June 2007	Head of Species, KWS
	Employment of Grevy's Zebra Liaison Officer	Grevy's Zebra Liaison Office coordinates implementation of the Strategy	All	30 June 2007	Head of Species, KWS
	Site Committees established	Site Committees are constituted and reporting structures, responsibilities and terms of reference are set and adhered to	All	Immediate	Stakeholders
	Establish a Grevy's Zebra Technical Committee	Technical committee is constituted and reporting structures, responsibilities and terms of reference are set and adhered to	All	30 June 2007	Director, KWS
	Develop Terms of Reference for Committees	Terms of Reference agreed developed and approved	All	31 May 2007	Belinda Low & Paul Muoria
	Centralisation of Grevy's zebra data	Stakeholders share data, information, reports and publications concerning Grevy's zebra	All	Dec. 2007	Liaison Officer
	Establish a KWS outpost to enhance communications for stakeholders in remote areas	Communities in remote areas are contactable	Remote northern populations	30 June 2007	Head of Species, KWS

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Communities	Develop income generating activities	No. of ecotourism projects/facilities Increased income from enterprises	Community areas with high GZ conservation potential	Continuous	Communities Affiliated partners
	Education and awareness	No. of workshops and barazas No. of people/ stakeholders educated on Grevy's zebra	Low awareness areas	Annual	KWS Communities Affiliated partners
	Employ community scouts	No. of scouts employed and sustained No. of communication radios	Areas with high threat of illegal killing	Continuous	KWS Community Affiliated partners
	Forums between Grevy's zebra areas	No. of Site Committee meetings	Wamba, Laikipia, Laisamis, El Barta, North	Quarterly	Site committees & affiliated partners
	Partnerships between community and Grevy's zebra stakeholders	No. of new partnerships	Community areas with high GZ conservation potential	Annual	KWS Communities Affiliated partners
	Measure of knowledge and attitude	Survey tool/method developed	Wamba, Laikipia, Laisamis, El Barta, North	Annual	GZ Technical Committee
	Participatory land use plans	No. of land use plans developed and implemented Improved land use practices	Community areas with high Grevy's zebra conservation potential	1 st year	Communities & Site Committees
	Grazing management committees	No. of active grazing committees	Conservancies	Quarterly	Conservancies & Site Committees



Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Protection & Legal Status	Monitor status of Grevy's zebra East Samburu/ Buffalo Springs and Shaba national reserves	Knowledge on Grevy's zebra numbers, distribution, movement and survival in areas East of Samburu/ Buffalo Springs/ Shaba Complex	Isiolo	Continuous	AWF National Reserves Community
	Monitor status of the more remote Grevy's zebra populations in the north	Knowledge on Grevy's zebra numbers, distribution, movement and survival in areas East of Samburu/ Buffalo Springs/ Shaba Complex	Remote north	Continuous	KWS MPT GZT
	Monitor the status of Grevy's zebra on private land	Knowledge on Grevy's zebra numbers, distribution, movement and survival on private land	Laikipia	Continuous	KWS LWF Private land owners
	Increase Grevy's zebra awareness among communities in Grevy's zebra range	Decrease in persecution and illegal killing of the species Improved attitudes towards Grevy's zebra	Low awareness areas	Annually	Conservancies Affiliated partners KWS
	Formation of local community scout programme in areas with Grevy's zebra	Employment of Grevy's zebra community scouts in areas with significant Grevy's zebra populations Reports on suspected Grevy's zebra poaching investigated and followed up Decrease in illegal killing incidents	Populations where poaching threat is high	Two years	Communities Affiliated partners KWS
	Support Community Conservancies to diversify their economic base and promote the generation of wildlife-based income	Number of successful alternative income-generating initiatives developed	Community areas with high GZ conservation potential	Five years	NRT AWF Other partners
	Work with traditional healers and the public health sector to facilitate access to diagnosis and treatment for the disease in communities that utilise GZ for its medicinal properties	Decrease in poaching incidents for medicinal properties	Communities that utilise GZ for medicine	Two years	Communities GZT, KWS Ministry of Health
	Upgrade the legal status of Grevy's zebra in Kenya.	The legal status of Grevy's zebra in Kenya upgraded from Game Animal to Protected Species.	All	Immediate	KWS GoK Ministry

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Natural Resources	Identification and conservation of breeding hotspots for Grevy's zebra	Map of Grevy's zebra ranging areas and breeding hotspots Improved foal survival Lactating females travel shorter distances to water	All	One year	KWS Conservancies Affiliated partners
	Establishment of livestock-free core conservation areas within Community Conservancies	No. of core conservation areas set aside	All	Continuous	KWS Conservancies NRT
	Develop and implement ecosystem monitoring programmes incorporating planned livestock grazing in rangeland management	Established grazing by-laws No. of active grazing committees No. of training sessions held No. of planned grazing programmes established Improved health of rangelands	Conservancies with high GZ conservation potential	Five years	Conservancies NRT GZT
	Develop incentives for local communities to promote Grevy's zebra conservation on their land	Increased investment into community conservation and development initiatives	Communities with high GZ conservation potential	Continuous	KWS Communities Affiliated partners
	Empowerment of local Community Conservancies to incorporate Grevy's zebra in their conservation plans	Increased investment into community conservation and development initiatives	Communities with high GZ conservation potential	Continuous	KWS Communities Affiliated partners
	Provide logistical support to existing grazing committees and encourage establishment of new ones	Committees are able to meet regularly and actively implement planned grazing	Communities with high GZ conservation potential	Continuous	KWS Communities Affiliated partners
	Develop improved rangeland conditions through soil and water conservation and reseeded	Successful reseeded programmes implemented Health of rangeland improves	Conservancies	Five years	Conservancies & affiliated partners
	Promote and strengthen community tourism initiatives and other wildlife or natural resource-based income	Revenue to communities increases	Communities with high GZ conservation potential	Continuous	KWS Communities Affiliated partners
	Address the Ewaso Ng'iro off-take for highland irrigation	Implementation of Water Act Improved water flow beyond Archer's Post	Highland areas	Five years	ENNDA Water Resource Management Authority GoK Line Ministries
	Promote water catchments conservation and rehabilitation	Acreage re-afforested Develop wood lots	Ewaso water catchment	Five years	ENNDA

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Disease	Elect a small and effective Disease Response Committee (DRC) and Coordinator	Disease Response Committee is activated	All	First meeting of National Management Committee	National Management Committee
	Activate an international Disease Response Listserv of Grevy's zebra stakeholders and disease experts to be managed by the DRC Coordinator	Grevy's Zebra Disease Response Listserv activated	All	After first meeting of National Management Committee	DRC Coordinator
	Preparedness and Action Plan for Disease Epizootics in Grevy's Zebra Range developed by the Grevy's Zebra Task Force (in preparation).	Distribution of report for reference	All	August 2007	KWS GZT
	Administer annual vaccination boosters to livestock against anthrax and other infectious diseases in Grevy's zebra hotspot areas	Livestock in core Grevy's zebra areas is protected against anthrax	High risk areas	Continuous	KWS DVS Communities Affiliated partners
	Maintain long-term surveillance of anthrax and other relevant diseases.	Disease outbreaks are detected early to control spread	Core Grevy's zebra range	Continuous	KWS DVS Communities Affiliated partners
	Collect blood samples from all immobilised Grevy's zebra for routine disease testing	Potential diseases threatening Grevy's zebra are identified & understood	All (as opportunities arise)	Continuous	KWS Affiliated partners
	Collect blood or tissue samples from Grevy's zebra carcasses where cause of death is unknown.	Role of diseases in Grevy's zebra mortality is understood	All	Continuous	KWS Affiliated partners
	Establish an emergency fund that can be used to mobilise teams in the event of future disease outbreaks	Funds immediately available to address serious threats	All	First meeting of National Management Committee	National Management Committee
	Identify existing Frontline Animal Health Workers for sampling and other veterinary aspects in Grevy's Zebra range	Team of Frontline Animal Health Workers engaged across Grevy's zebra range	All	By end of 2007	KWS DVS Communities Affiliated partners
	Train community Para-vets in Grevy's zebra areas	Para-vets are identified and trained	Core Grevy's zebra range	Six months	KWS DVS Communities Affiliated partners

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Disease	Maintain a list of potential diseases and their symptoms that can affect Grevy's zebra	Potential diseases threatening Grevy's zebra are identified and understood	All	Continuous	KWS DVS
	Distribute guidelines for carcass management in Grevy's zebra range (wildlife and livestock)	Carcasses are appropriately managed so that the threat of infection is minimised	All	Six months	KWS DVS Affiliated partners
	Initiate Epidemiological research on disease in Grevy's zebra range	Applied research projects on Grevy's zebra epidemiology is established	Core Grevy's zebra range	Continuous	KWS DVS GZ Technical Committee
	Diagnostic equipment should be procured and a diagnostic lab established	KWS carries out all disease diagnosis for Grevy's zebra samples	-	One year	KWS
Predation, Inter-specific Hybridisation and Competition	Monitor plains zebra population size and structure in relation to Grevy's zebra in areas where plains zebra density is significantly higher	Secure data on the population size and structure of plains zebra	Private & Community Conservancies, Laikipia Ranches, Tsavo and National Reserves	Continuous	Respective land owners Monitoring teams
	Support and expand ongoing research on the impact of predation on Grevy's zebra population dynamics	Impact of predation on Grevy's zebra clearly understood	Populations that appear to be at high risk from predation	Continuous	Respective land owners Monitoring teams KWS
	Determine the lion population size and structure in the National Reserves and the level of predation on Grevy's zebra	Secure data on lion predation levels	National Reserves	One year	KWS National Reserves Monitoring teams
	Establish the population sizes of other potential prey species particularly in the protected areas	Prey population dynamics understood in context of Grevy's zebra & predator interactions	Private & Community Conservancies, national reserves	One year	Respective land managers Monitoring teams
	Reduce number of lions if there is sufficient data to prove that lions are significantly limiting Grevy's zebra numbers	No. of lions reduced Predation levels balance out Increased Grevy's zebra survivorship	GZ populations of high conservation value	As needed	KWS Respective land managers Monitoring teams

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Predation, Inter-specific Hybridisation and Competition	Support ongoing research into hybridisation	Secure data on the dynamics and threat level of hybridisation	OI Pejeta Sosian Tsavo	One year	KWS Respective land managers Monitoring teams
	Develop clear guidelines on how to address the issue of hybridisation and intervention mechanisms	Areas are actively managed to reduce incidents of hybridisation	OI Pejeta Sosian Tsavo	One year	KWS Respective land managers Monitoring teams
	Draw up and implement management plans for protected areas within Grevy's zebra range	Protected areas adaptively managed	National Reserves & Parks with Grevy's zebra	Two years	Protected area management teams
Capacity-building	Review and assess training needs	Training needs assessment developed	All	Six months	KWS Affiliated partners
	Carry out appropriate training based on the training needs assessment	No. of training sessions No. of trained, qualified personnel	All	Continuous	Communities KWS Affiliated partners
	Develop standardized training manuals for the monitoring scouts	Manuals developed based on existing standardised Grevy's zebra monitoring methodology	All	Six months	Communities KWS Affiliated partners
	Develop Terms of Reference for community scouts	Terms of Reference developed based on real working models	All	Immediate	Communities KWS Affiliated partners
	Set up a sustainable training of trainers	Capacity of communities to train others is built	All	Five years	Communities KWS Affiliated partners
	Increase numbers of local technical personnel (scientists) within Grevy's zebra conservation and management	No. of local technical personnel increases	All	Five years	Communities KWS Affiliated partners
	Build conservation expertise in communities	Capacity and knowledge of communities to implement conservation increases	All	Five years	Communities KWS Affiliated partners

Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Capacity-building	Requirements for equipment and infrastructure identified and then procured and developed	Access to Grevy's zebra areas is enhanced Conservation programmes more easily facilitated	All	Five years	Communities KWS Affiliated partners
Population Monitoring	Map currently known Grevy's zebra distribution in Kenya	GIS map of currently known Grevy's zebra distribution and continually updated	All	June 2007	AWF, NRT, GZT, Princeton
	Map known movements of Grevy's zebra	GIS map of known Grevy's zebra movements continually updated	All	Continuous	All
	Map areas where each organization is monitoring Grevy's zebra	GIS of areas where each organisation is monitoring	All	June 2007	All organisations carrying out GZ monitoring
	Identify current monitoring methods in use per area	Meeting of monitoring organisations	All	July 2007	All organisations carrying out GZ monitoring
	Identify a standardized method for a national census including time of year, identification of counting blocks, responsible organisations and prioritisation of areas that require more intensive monitoring	Meeting to establish standardised census methods Areas identified for extended monitoring	All	July 2007	All organisations carrying out GZ monitoring
	National census every five years	Census figures published	All	August 2007	To be agreed in first meeting of National Management Committee



Annex VI: (continued)

Strategic Objective	Action	Indicator	Target Area/ GZ population	Time Frame	Responsibility
Increasing Numbers	Develop a protocol with clear guidelines on the establishment of breeding populations within Grevy's zebra range taking into consideration minimum population size, sex ratio, habitat types, translocations and predator naivety	Guidelines allow for populations to successfully reproduce to provide surplus animals for restocking	Land owners within existing Grevy's zebra range with capacity & willingness to invest in livestock-free, predator-proof areas to enhance survival & breeding	One year	KWS Land owners National Management Committee
	Establish a small breeding population	Populations are successfully reproducing to provide surplus animals for restocking	As above	One year	KWS Land owners National Management Committee
	Partner with zoological institutions to enhance management	Genetic diversity within populations remains healthy	As above	As needed	KWS Land owners Zoological institutions
	Augment existing populations in Grevy's zebra range with individuals born from the population	Successfully breeding populations provide a source in the long-term for translocation to enhance existing populations in other areas	As above	Five years	KWS Land owners Executive Committee



Annex VII

National Grevy's Zebra Task Force Members

Patrick Omondi	KWS
Dr. Charles Musyoki	KWS
Belinda Low	GZT
Dr. Paul Muoria	AWF
Dr. Philip Muruthi	AWF
Dr. Francis Gakuya	KWS
Dr. Thomas Manyibe	KWS
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