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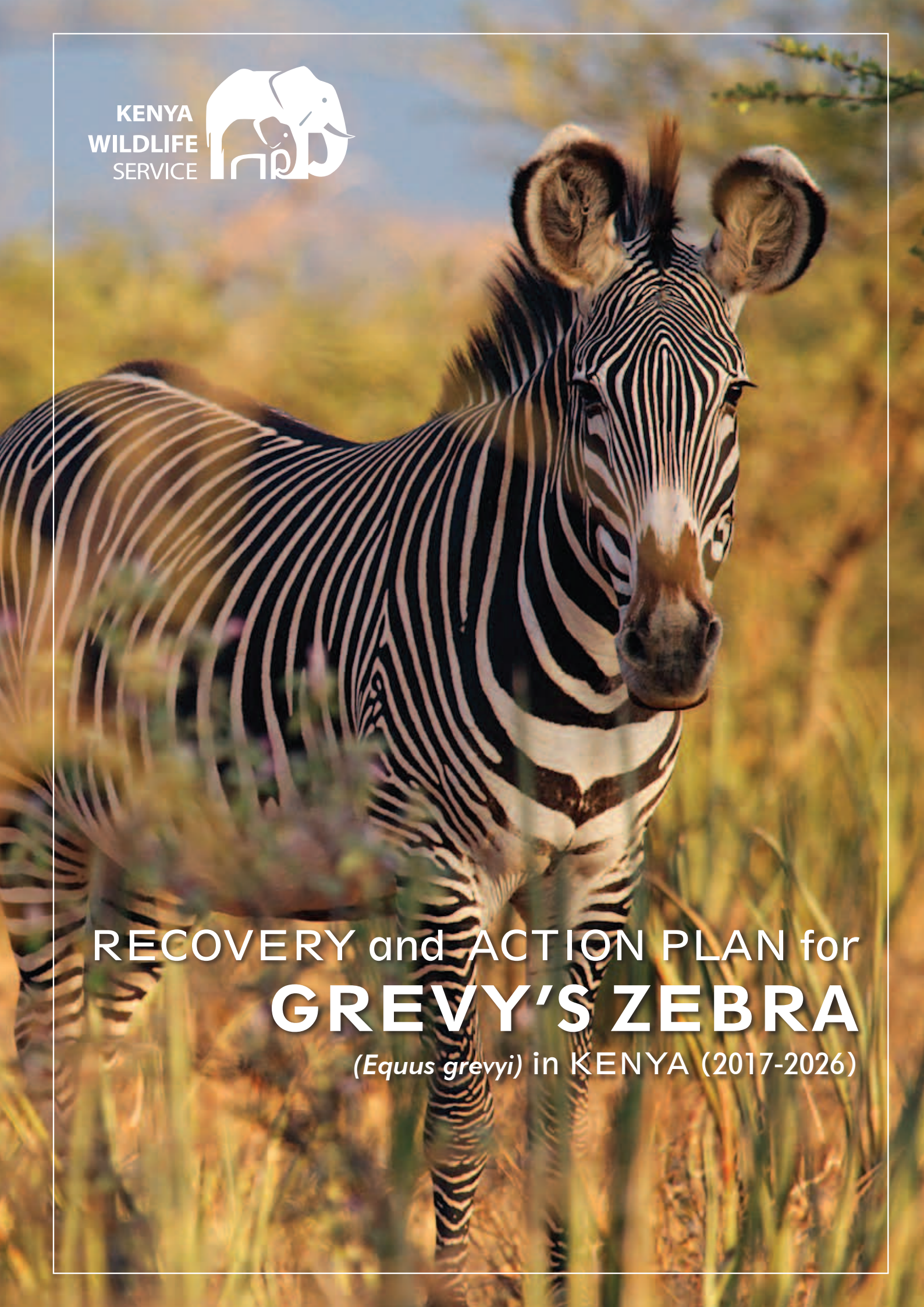

RECOVERY and ACTION PLAN for
GREVY'S ZEBRA
(Equus grevyi) in KENYA (2017-2026)


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RECOVERY and ACTION PLAN for GREVY'S ZEBRA (*Equus grevyi*) in KENYA (2017-2026)

Produced at the Grevy's Zebra National Strategy Review Workshop held from 26-27 January 2017 at Mpala Research Centre, Laikipia, Kenya.

Compiled by: The National Grevy's Zebra Technical Committee

Cover photo credit: Nelson Guda

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P. O. Box 40241 – 00100, Nairobi, Kenya.
Email: kws@kws.go.ke

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Abbreviations and Acronyms

CI	Confidence Interval
CIDP	County-Integrated Development Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DRC	Disease Response Committee
EWCA	Ethiopian Wildlife Conservation Authority
GGR	The Great Grevy's Rally
GSM	Global System for Mobile Communication
GZLO	Grevy's Zebra Liaison Officer
GZT	Grevy's Zebra Trust
GZTC	Grevy's Zebra Technical Committee
IBEIS	Image Based Ecological Information System
ID	Identification
IUCN	International Union for Conservation of Nature
Ksh	Kenyan Shilling
KWS	Kenya Wildlife Service
LAPSSET	Lamu Port-South Sudan-Ethiopia Transport Corridor
LWC	Lewa Wildlife Conservancy
LWF	Laikipia Wildlife Forum
MOU	Memorandum of Understanding
MSc	Master of Science
MW	Marwell Wildlife
NEMA	The National Environment Management Authority
NGO	Non-Governmental Organisation
No.	Number
NRT	Northern Rangelands Trust
OPC	Ol Pejeta Conservancy
OWS	Oserian Wildlife Sanctuary
SO	Strategic Objective
STE	Save the Elephants
TNC	The Nature Conservancy
TOR	Terms of Reference
USD	United States Dollar
WRUA	Water Resources Users Association

Foreword by the

Chairman of the Board of Trustees of KWS

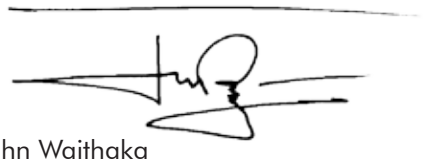
Kenya Wildlife Service (KWS) is a State Corporation established by an Act of Parliament and has the legal mandate to conserve and manage wildlife in the country and enforce related laws and regulations. Since its inception in 1990, KWS has achieved much in strengthening conservation programmes, curbing poaching, enlisting support in conservation, establishing appropriate infrastructure and developing human capacity. This success has been made possible through support from the Government of Kenya, international and local donors, and other development partners.

Kenya hosts numerous wildlife species, some of which are abundant and widespread whereas others are threatened and geographically localized to certain parts of the country either due to natural and/or anthropogenic factors. Conservation measures for endangered and threatened species may include conserving and restoring habitats, establishing programmes for monitoring and managing population health and active involvement of stakeholder partnerships. Knowledge of the natural history of a species is essential to understanding its needs and developing effective and appropriate conservation measures. To carry out our mandate effectively, recovery and action plans are developed for rare and endangered species with well formulated, scientifically-sound strategies to protect and build up existing populations.

Section 49 of the Wildlife Conservation and Management Act (WMCA), 2013 states that the Service may develop and implement recovery plans for the conservation and management of all species listed on the sixth schedule. Thus, to comply with the WMCA, 2013 Conservation and Management strategies are now referred to as Recovery and Action Plans.

This new Recovery and Action Plan for Grevy's Zebra incorporates well thought out prescriptions for site-specific management actions that are necessary to achieve desired goals for the conservation and long term survival of the endangered Grevy's zebra. The plan has been undertaken using a participatory and collaborative approach involving diverse stakeholders including local communities, county governments, conservation organisations, researchers, landowners and donors.

Conserving Kenya's wildlife is a shared responsibility and KWS calls upon all Kenyans, conservation organisations, development partners, and other stakeholders to support the implementation of this and other Species Recovery and Action Plans.



Dr John Waithaka

Chairman

Kenya Wildlife Service Board of Trustees

Preface by the Director General of KWS

The global community recognises the importance of conserving nature. The natural systems of the planet make human life possible but nature also makes life worth living by providing beauty, inspiration, and context for human life, as demonstrated in the cultural traditions of human societies from around the world.

The Kenya Wildlife Service (KWS) conserves and manages Kenya's wildlife for the Kenyan people and the world. The number and population size of Grevy's zebra have reduced drastically and the species' natural range has undergone one of the most dramatic constrictions 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 are loss of range, poaching, competition with domestic livestock for critical resources, disease and predation.

KWS recognises 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 in Kenya. The preparation and production of this Recovery and Action Plan for Grevy's Zebra in Kenya (2017-2026) has truly been a team effort. We are grateful to the Grevy's Zebra Technical Committee which provided tremendous support, active participation and contributions in all the processes involved in developing this plan. In this document we provide guidance to all actors and partners on when and how to implement actions to achieve Kenya's Grevy's zebra conservation goals. We expect that this recovery and action plan will be an evolving document, with further explanations and links to reference materials added over time; hence the information provided here will be reviewed periodically as more is learned about the best ways to achieve effective Grevy's zebra conservation.

The challenge is to translate the efforts made in compiling this document into effective action and, in particular, to ensure that the recommended actions are implemented and their results monitored throughout this action plan's life time. It is clear that species conservation strategies alone do not save species: strategies and action plans provide the context for well-coordinated and effective action, and the processes used to develop them should consider the most effective ways to facilitate and motivate implementation.

We hope that this document will inspire conservation practitioners and partners in the private and public sectors and we invite all those interested and concerned in the persistence of this majestic species to join forces with the dynamic and committed team working tirelessly to achieve its objectives going forward.

Julius Kimani
Ag. Director General
Kenya Wildlife Service

Executive Summary

Grevy's zebra have undergone one of the most substantial reductions of range of any African mammal. Extirpated from Somalia, Grevy's zebra currently survives in Kenya and Ethiopia. Numbers of Grevy's zebra have declined from an estimated 15,000 in the late 1970s to 2,580 animals today, representing an 83% decline in global numbers. Kenya holds more than 90% of the global population in the wild.

The decline in Grevy's zebra is primarily the result of habitat degradation and loss, competition for resources with livestock, reduction of water sources and restricted access to water, hunting for meat, medicinal purposes or target practice, disease, hybridisation, predation, habitat conversion and pressures faced by small populations. During this action plan review, more recent threats were identified, including large-scale infrastructure development, human conflict and insecurity, and migration. Although included in the last strategy, hybridisation was removed as it is not considered a threat to Grevy's zebra populations at this time. All the major threats facing Grevy's zebra are symptomatic of the underlying drivers of increasing human and livestock populations and their expansion into the species' rangelands.

Over the last 15 years, significant investment has been expended in Kenya aimed at saving the Grevy's zebra from extinction. As a result, the declining trend has slowed. In January 2016, Kenya had approximately 2,350 Grevy's zebra and the majority of populations assessed had a healthy and sustaining population structure. However, worsening habitat degradation and loss, and resulting conflict continue to threaten the long-term survival of Grevy's zebra in the country.

The process for reviewing and developing this recovery and action plan for Grevy's zebra in Kenya took place in 2016 and early 2017. To ensure wider inclusivity, site workshops were held with stakeholders on the ground and this information then fed into the final review workshop. This plan retains the original vision and goal of the previous conservation strategy, to drive the conservation of Grevy's zebra for the next ten years with strategic reviews to be held internally every three years.

At the expiry of the 2012-2016 Grevy's zebra conservation strategy, significant progress towards four of the five strategic objectives (SOs) had been achieved, including SO 1 Coordination of the implementation of the strategy, SO 2 Enhancing stakeholder partnerships, SO 3 Enhancing Grevy's zebra conservation and habitat management and SO 4 Monitoring and managing Grevy's zebra population health. These strategic objectives have been carried forward in this action plan but revised within the context of a new socio-political landscape. Activities addressing conflict and insecurity, which fell under SO 4, have been expanded and strengthened under SO 3 to address these two issues that are the result of pastoralist migrations due to extreme weather events and localised rangeland degradation. Laikipia County has been recognised as a stronghold for the species with targeted and increased effort of Grevy's zebra conservation and management planned under SO 2.

Under SO 5 Transboundary Grevy's zebra conservation, most activities were not achieved. Given the importance of inter-regional collaboration for the long-term survival of the species at the regional level, the activities under this SO have been carried forward and revised to be inclusive of Ethiopia's own national action plan for Grevy's zebra. Finally, with large-scale infrastructure projects and increasing urbanisation on the horizon in Kenya, SO 6 Minimising the potential negative impacts of large-scale infrastructure development on Grevy's zebra populations was developed.

It is envisioned that this new timeline and framework will enable Grevy's zebra conservation stakeholders in Kenya to make significant progress in addressing the threats facing the species, working closely as partners in a coordinated and cost-effective way. The action plan acknowledges the wide-ranging and daunting scope of this conservation challenge. This recent revision, however, is testament to the success of these actors in operationalising the strong strategic vision it continues.

Introduction

Conservation status

In the latest Red List assessment for the species, Grevy's zebra were assessed as Endangered based on a population reduction of 56% over the past three generations (30 years) under criterion A2acd (Rubenstein *et al*. 2016) and is therefore considered to be facing a very high risk of extinction in the wild. This is based on an estimated population decline from 5,800 individuals in the late 1980s to a current estimate of 2,580 individuals in 2016 (Rubenstein *et al*. 2016). The current population estimate is a total from estimates of 2,350 individuals in Kenya in 2016 (Berger-Wolf *et al*. 2016) and 230 individuals in Ethiopia in 2011 (Rubenstein *et al*. 2016). Grevy's zebra have been classified as Endangered in every Red List assessment over the past 30 years (1986 to 2016).

Grevy's zebra are legally protected in both Kenya and Ethiopia, although in the latter, official protection has been limited. In Kenya, Grevy's zebra have been protected by a total hunting ban since 1977. However, Grevy's zebra are still listed as a 'Game Animal' under the Wildlife Conservation and Management Act No 376 of 1976 (Part II of the First Schedule) (Williams 2002) which was recently revised in 2013. This is despite a proposal to up-list the conservation status of Grevy's zebra to a legally 'Protected Animal' in 2007 (African Wildlife Foundation 2007). Grevy's zebra are listed on Appendix I of the Convention on International Trade in Endangered Species (CITES) which prohibits international trade in specimens except in exceptional circumstances and applies to both Kenya and Ethiopia.

Distribution and numbers of Grevy's Zebra in Kenya and Ethiopia

Once distributed across the Horn of Africa, Grevy's zebra have undergone a substantial range reduction (Figure 1). Historically, Grevy's zebra ranged through the Awash Valley, the Ogaden region and north-east of Lake Turkana in Ethiopia; in northern Kenya east of the Rift Valley and north of Mount Kenya and the Tana River; and east into southwestern Somalia (Bauer *et al*.1994; Williams 2002). Despite being included in historical range maps, there are no confirmed records that the species ever occurred in Eritrea or Djibouti (Bauer *et al*. 1994). Sightings in South Sudan are questionable and need to be verified (Williams 2002, 2013). Grevy's zebra are considered extirpated from Somalia.

Currently, Grevy's zebra have a discontinuous range in Ethiopia and Kenya. In Ethiopia, Grevy's zebra populations are known to exist in three distinct populations. There is a small, isolated population in the Alledeghi Plains northeast of Awash National Park. From Lake Chew Bahir, and Sarite near Yabelo, in southern Ethiopia, the species current range extends south along the eastern side of the Rift Valley to just north of Mount Kenya in Kenya. However, there are only two areas with confirmed populations in southern Ethiopia. In Kenya, the species is mainly restricted to northern Kenya, with small, introduced populations in Tsavo National Park and Oserian Wildlife Sanctuary (OWS) in Naivasha (KWS 2012). Formerly found in Garissa and Wajir Counties, there are infrequent sightings of about 15 individuals near Garissa. In northern Kenya, Grevy's zebra have moved south over the past 30 years leaving low density, widely scattered populations in Marsabit County, with Samburu and Laikipia Counties becoming strongholds for the species.

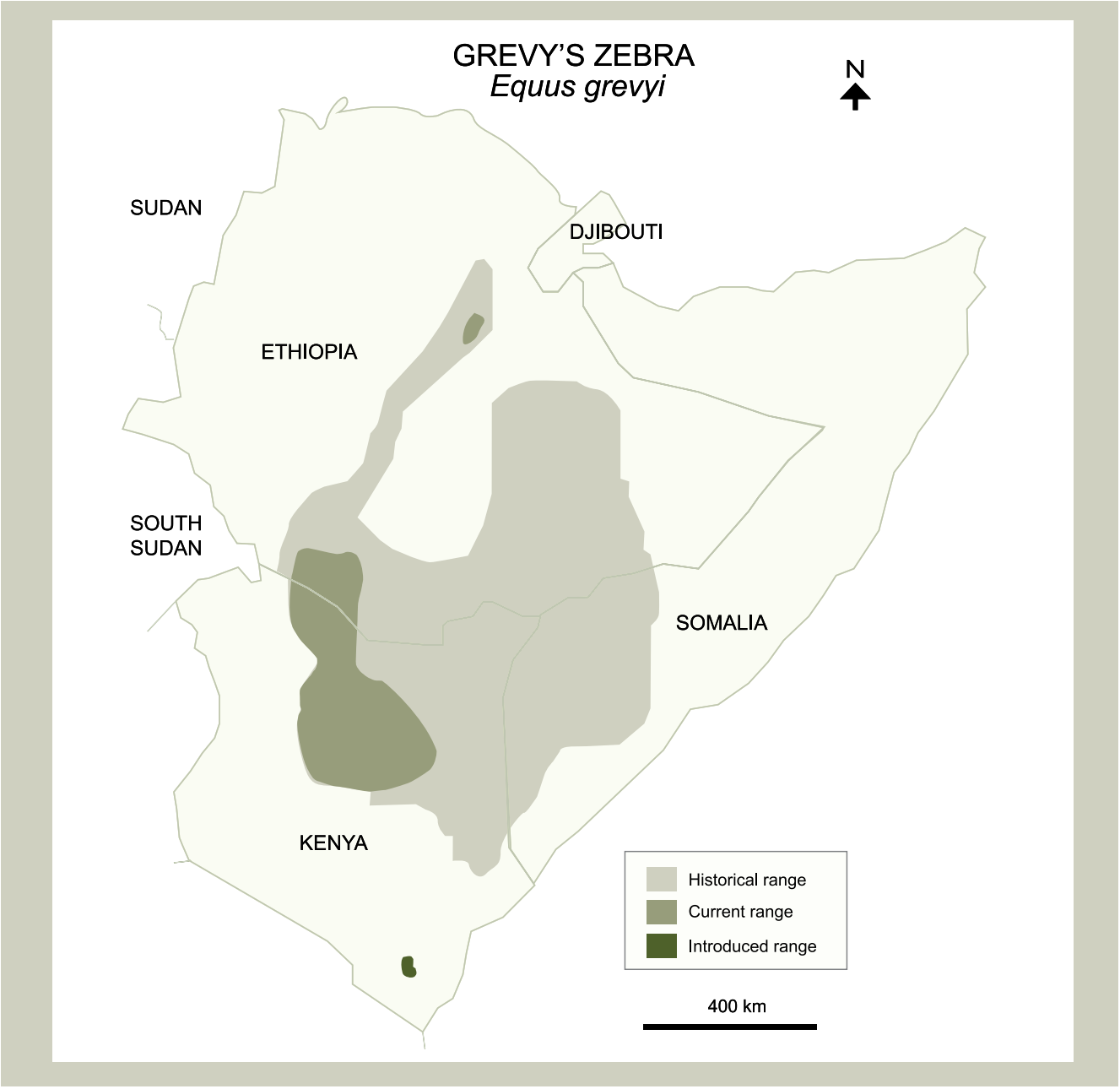


Figure 1. *Grevy's zebra historic and current range in Kenya and Ethiopia (Moehlman* et al. *2016).*

To tailor conservation and management activities to regional threats in this new action plan, Grevy's zebra populations in Kenya have been divided into four zones - three regional populations and a fourth zone which consists of introduced populations outside their historical range and small, isolated populations within the current Grevy's zebra range (Figure 2, Table 1). These four zones were developed based on geographic locations and a similarity of the threats faced by populations in each zone. One activity in this new action plan will be to review and update the map of Grevy's zebra current distribution in Kenya and Ethiopia.

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Grevy's Zebra Ambassadors collect data on Grevy's zebra in El Barta, Samburu North

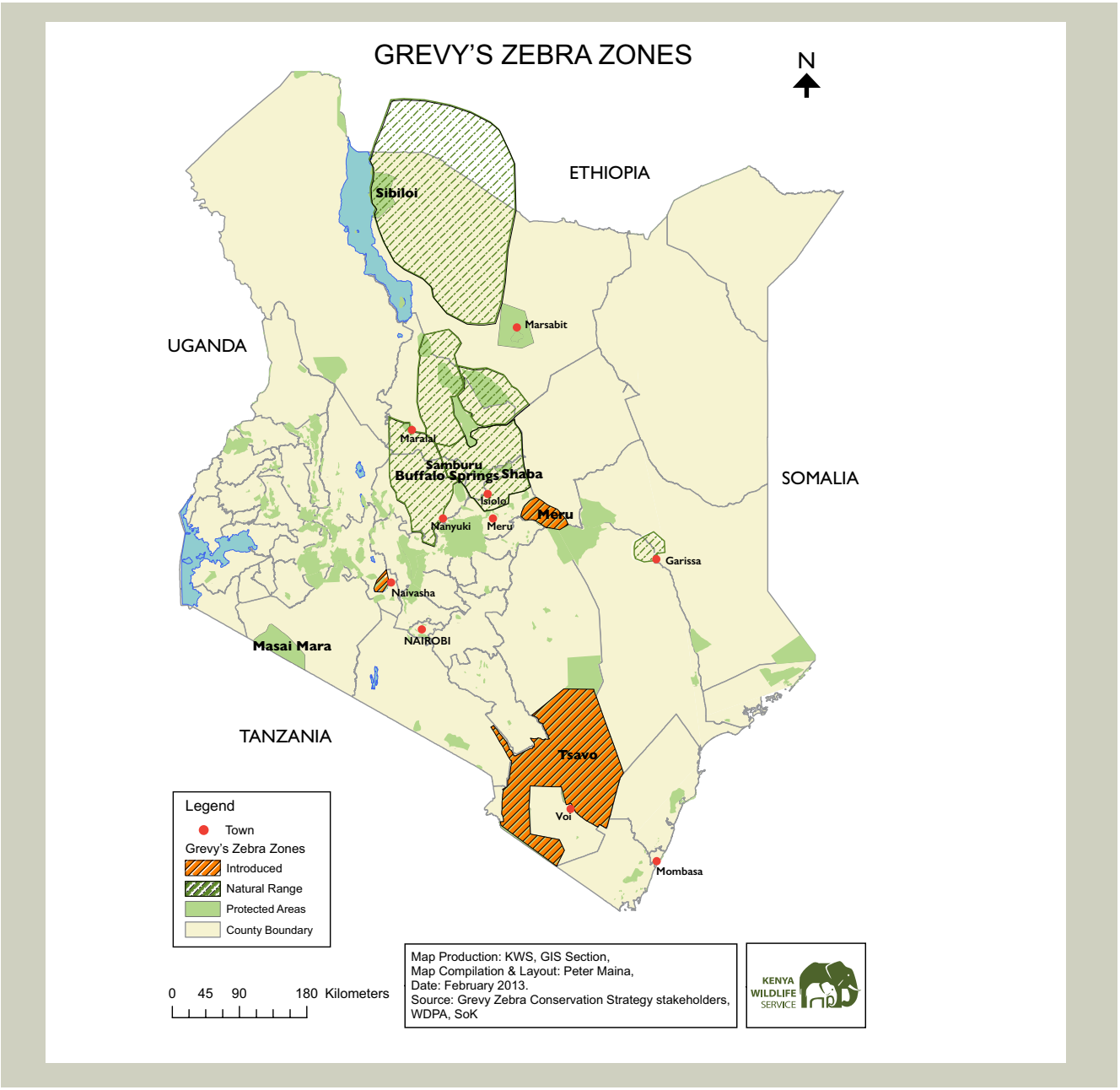


Figure 2. *Grevy's zebra conservation zones in Kenya showing Grevy's zebra range and introduced populations (KWS 2012).*

Table 1. *Description of the range of Grevy's zebra populations in the four zones that have been used for targeting strategic activities.*

Population	Description of range
Wamba	The Wamba population covers Samburu East and Central and parts of Isiolo County. This includes Samburu, Buffalo Springs and Shaba National Reserves and Lewa Wildlife Conservancy (LWC).
Laikipia	The Laikipia population covers Laikipia County where Grevy's zebra inhabit both private and communally owned land.
El Barta	El Barta covers Samburu North and South Horr in Marsabit County.
Other small populations	Other populations include introduced populations in Tsavo National Park and OWS and other small populations in Grevy's zebra current range including Sibiloi and Meru National Parks.

Grevy's zebra have suffered a severe population reduction, declining from a global population of around 15,000 individuals in the late 1970s/early 1980s (KWS 2012) to an estimate of 2,580 in 2016 (Rubenstein *et al.* 2016). Population estimates over time have documented this rapid decline in both Kenya and Ethiopia and have been covered in previous strategies (KWS 2007, 2012). A table of previous population estimates is included in Annex 1.

Estimates for Grevy's zebra populations in Ethiopia suggest a minimum of a 94% decline between 1980 and 2003 (23 years) with an estimated 1,900 animals in 1980 (Klingel 1980) to 110 animals in 2003 (Williams *et al.* 2003). In 2011, Ethiopia's population was estimated to have increased to approximately 230 individuals, of which most are found in Alledeghi Wildlife Reserve (196 individuals), with very few individuals remaining in Chew Bahir (22 individuals) and Borana (10 individuals) (Ethiopian Wildlife Conservation Authority and IUCN/SSC Equid Specialist Group 2017).

Estimates for Grevy's zebra populations in Kenya suggest a similarly steep decline. A recent analysis of systematic aerial monitoring survey data[1] found that Grevy's zebra numbers declined by 87% between 1977-1980 (14,447 individuals) and 2011-2013 (1,874 individuals) – with 74% of this decline occurring between 1977-1980 and 1994-1997 (Ogutu *et al.* 2016). This supports suggestions that the decline has slowed in recent decades. Recent aerial surveys suggest that there has been a decline in recent years (Figure 3). However, in 2016, a comprehensive capture-recapture census of Grevy's zebra in five counties in northern Kenya was conducted - 'The Great Grevy's Rally' (GGR) which suggests populations have stabilised (Berger-Wolf *et al.* 2016). This census provided a higher estimate than the aerial surveys of 2,250 (95% CI of +/- 93) individuals in the areas where the count was done (Figure 4). An additional 100 animals were estimated to be collectively in Tsavo area, OWS, Meru National Park and areas not surveyed in Laisamis and El Barta. This figure was added to the census results to give a national estimate of 2,350 individuals in 2016. Whilst previously not a stronghold for Grevy's zebra, the highest numbers of Grevy's zebra were recorded in Laikipia. The census also found that four out of the five populations surveyed were 'healthy and sustaining' i.e. 30% (or just under 30%) of the populations were made up of foals and juveniles. This suggests that the population has good potential for growth based on sustained survival and recruitment going forward.

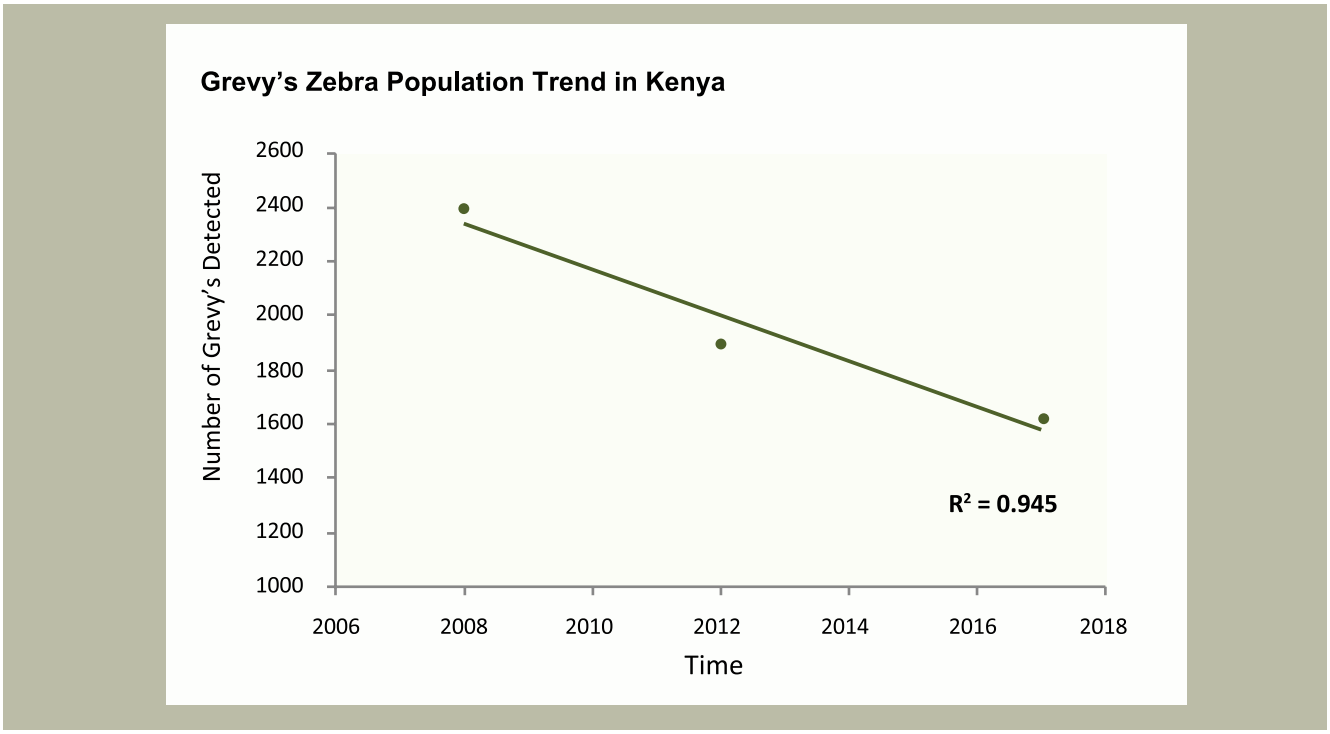


Figure 3. *Grevy's zebra population trend in Kenya from 2008 to 2017 based on aerial surveys (Ngene* et al. *2013, Ngene* et al. *2018).*

[1] *Collected by the Directorate of Resource Surveys and Remote Sensing of Kenya (DRSRS), and its predecessors, the Kenya Rangelands Ecological Monitoring Unit (KREMU: 1976–1986) and the Department of Resource Surveys and Remote Sensing (1986–2013) (Ogutu* et al. *2016).*

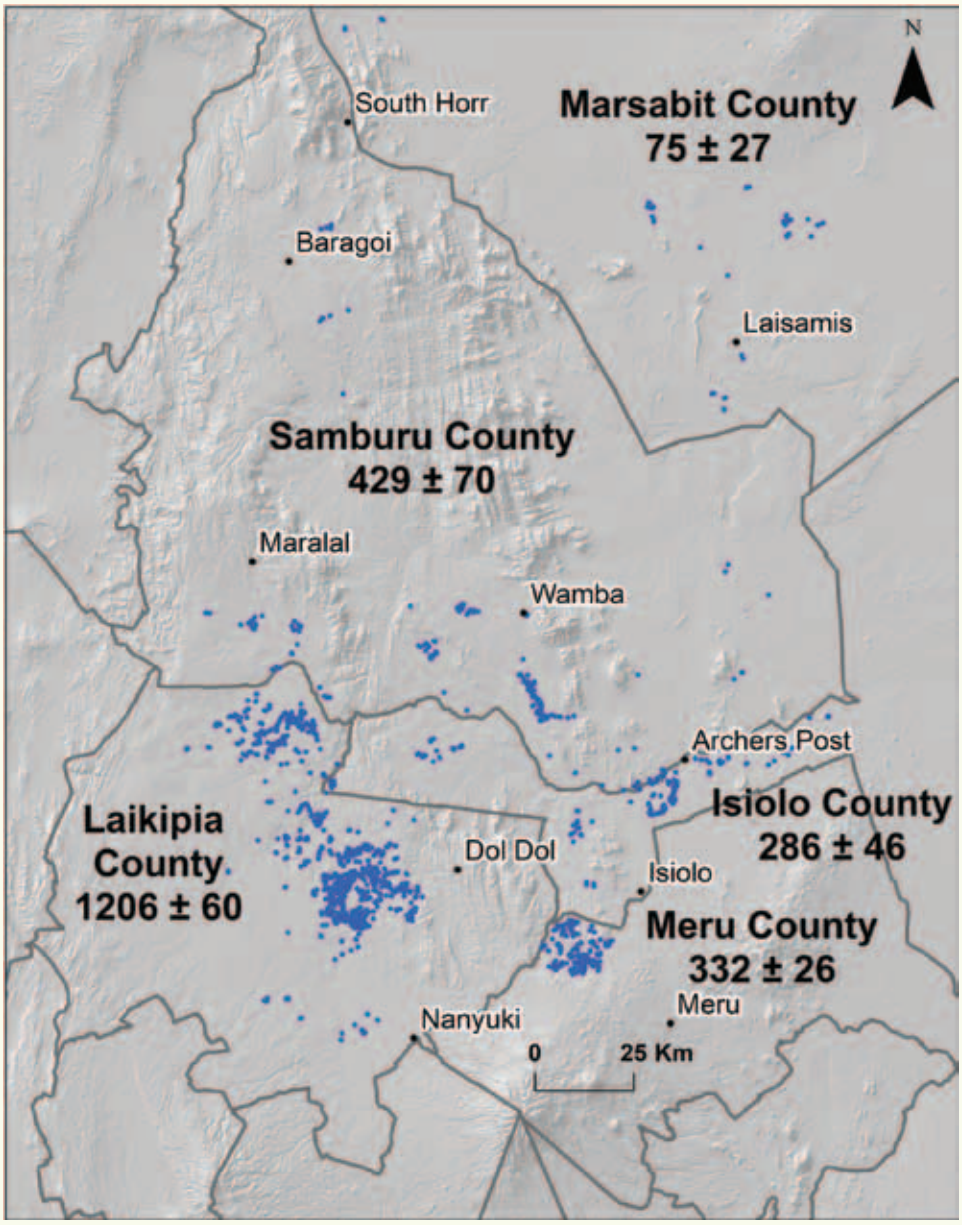


Figure 4. *Grevy's zebra numbers (± 95% CI) counted in each county during the 2016 GGR (reproduced from Berger-Wolf et al. 2016)*

© Great Grevy's Rally

A citizen scientist taking photos of Grevy's zebra during the Great Grevy's Rally 2016

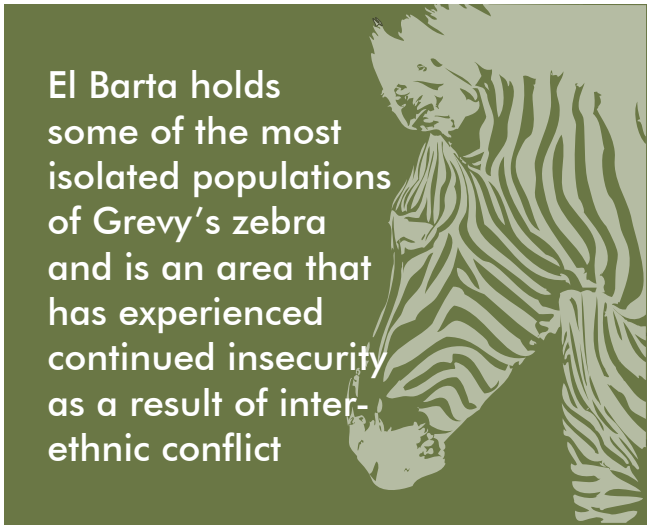
Threats

In Kenya, hunting Grevy's zebra for their skins caused their rapid decline in the 1970s until a total hunting ban came into effect in 1977. Since the 1970s, new threats have arisen which play a significant role in limiting Grevy's zebra population growth in Kenya. The 2012-2016 strategy (KWS 2012) assessed and ranked the threats to Grevy's zebra (p.12) in order of importance as: (1) habitat degradation and loss; (2) competition for resources with livestock, reduction of water sources and restricted access to water; (3) hunting; (4) disease; (5) hybridisation; (6) predation and (7) habitat conversion and small population size. In 2016, the Grevy's Zebra Technical Commitee (GZTC) determined that threats to Grevy's zebra, and their rankings, remained the same as in 2012 (Rubenstein *et al.* 2016).

Due to the extended period of this action plan's implementation (ten years compared to previous strategies that expired after five years), a primary objective of the 2017-2026 recovery and action plan formulation process was to not only identify and rank for important current threats to the species but also identify important emerging threats. This was achieved during a series of workshops held in 2017 (described in Annex 2). Regions were assessed individually to ensure that threats in each region were identified and that there was increased ownership of the strategic review process at the field management level. It should be emphasised that the decline in Grevy's zebra can be attributed to threats that have changed in their nature and intensity since the 1970s. It will be essential to complete a comprehensive regional threat assessment during each three-year review to ensure that activities are addressing the most critical threats to Grevy's zebra.

For coherence, priority threats are summarised here in the same way as the 2012-2016 strategy (KWS 2012) and ranked according to their importance across all regions. Some threats were ranked of equal importance. Specific regional information is provided both in table 2 and the text below and mitigation activities targeting threats are included within each Strategic Objective (SO). The main threats to Grevy's zebra are habitat degradation, competition for resources with livestock, reduction of water sources and restricted access to water, habitat conversion and loss (including large-scale infrastructure development), human conflict, insecurity and migration, small population sizes, hunting, disease and predation. Stakeholders also said that limited impact of governance agencies was an important threat to the successful conservation of Grevy's zebra (discussed in the 'wider context' section).

In Wamba, the main threats to Grevy's zebra included those related to rangeland degradation, and additionally, a lack of grazing and water resources and increased competition with livestock. In Laikipia, the risk of insecurity and conflict related to migrating pastoral communities and land use change related to development were identified as the biggest threats. Stakeholders also discussed that if the main threats in Laikipia were not addressed, then Grevy's zebra may decline, reducing to small isolated populations. El Barta holds some of the most isolated populations of Grevy's zebra and is an area that has experienced continued insecurity as a result of inter-ethnic conflict. The biggest threat in this region is poaching for bush meat, using illegal guns which are a result of the conflict. Poor veterinary services, due to lack of human resources and the isolation of the Grevy's zebra populations, is also a challenge. It should be noted that addressing threats in all of the more remote areas of the Grevy's zebra range is hampered by limited organisational resources. The biggest threat to other small populations was identified as the biological effects of existing as small populations, including increased predator pressure and increased susceptibility to disease-related mortality.



Hybridisation, listed as a threat during the 2012-2016 strategy (KWS 2012) was not identified as a priority threat during the formulation of the new recovery and action plan. Although the occurrence of hybrid individuals where Grevy's zebra males mate with plains zebra females was noted, the threat to the Grevy's zebra population was not significant as genes currently only flow from Grevy's zebra to plains zebra (Cordingley *et al.* 2009). Where these instances arise, the cause is likely due to a skewed male: female sex ratio as a result of other underlying factors, such as small populations. Hybridisation appears to be largely limited to the southern periphery of the Grevy's zebra range, notably Laikipia, where Grevy's zebra and plains zebra ranges overlap and where plains zebra densities far outnumber Grevy's zebra.

Table 2. *Threats to Grevy's zebra. (Note that some threats were ranked of equal importance)*

Rank	Threat	Cause	Threatened population(s) / Remarks
1.	Habitat degradation	• Heavy, sustained grazing by domestic livestock resulting in changes to vegetation communities and erosion. • Expansion of unplanned settlements into areas that previously had only low densities of people and livestock. • Loss of traditional natural resource management structures. • Changes in water quantity and quality because of increased abstraction of perennial river water for irrigation in highland areas, climate variability, sedimentation and associated water table changes. • Increasing climatic variability such as frequency and duration of drought.	• Habitat degradation is the most serious threat for all populations, but particularly in Isiolo, Marsabit and Samburu Counties.
2.	Competition for resources with livestock, reduction of water sources and restricted access to water	• Competition with relatively high densities of domestic livestock for limited resources (pasture and water), particularly in the dry season. • Competition caused by displacement, encroachment and harassment by herders. For example, the presence of livestock at water sources during both the day and night displace Grevy's zebra. • Reduction of water sources attributed mainly to exclusion of wildlife from water sources by people, for example the fencing of shallow wells and seepage points, rather than changes in water quality and quantity (although the latter can drive the former). Generally, reduction of water sources is an issue of access more than it is of availability or amount.	• Reduction of water sources threatens all Grevy's zebra populations, but particularly those dependent on water from the Ewaso Ng'iro river basin (Isiolo, Marsabit and Samburu Counties). • Restricted access to water threatens small and potentially isolated Grevy's zebra populations in the more arid parts of their range, including Laisamis, Karole Sibiloi and El Barta.
2.	Habitat conversion and loss	• Large infrastructure projects, planned throughout the Grevy's zebra range in northern Kenya, directly cause habitat conversion and loss as infrastructure replaces native vegetation but also often facilitate rapid land transformation around them through fragmentation and the immigration of people. • Lack of collaboration between scientists, NGOs, government stewards of wildlife and infrastructure development agencies.	• Large infrastructure development threatens all major Grevy's zebra populations (Isiolo, Laikipia, Marsabit and Samburu Counties). • Some infrastructure projects have already started whilst others are considered future threats. However, it is critical that engagement starts during the planning process in order to limit negative impacts.
3.	Human conflict, insecurity and migration	• Insecurity can lead to increased levels of poaching using illegal weapons. • Migration of pastoral communities seeking pasture and water into areas used by Grevy's zebra, particularly during times of drought, can increase the risk of degradation and the risk of conflict between migrating communities and resident community and private landowners and promote unplanned settlement. • It can also lead to the displacement of local Grevy's populations which can fragment them into smaller populations.	• Insecurity and conflict is a threat to Grevy's zebra in El Barta as it increases the risk of poaching. • Migration of pastoral communities is a threat to all populations (Isiolo, Laikipia, Marsabit and Samburu Counties).

Rank	Threat	Cause	Threatened population(s) / Remarks
4.	Small population size	• Unstable breeding populations due to skewed male: female sex ratio. • Habitat loss and fragmentation driven by migrating communities, development, changing land use and fencing and trenching of land. • Lack of a metapopulation management plan for source and sink populations. • Increased vulnerability to reduced gene flow, disease (see below) and predation (see below) which can facilitate further population decline.	• Introduced populations (Tsavo and Meru National Parks and OWS) and small populations (Sibiloi National Park). • All Grevy's zebra populations (Isiolo, Laikipia Marsabit and Samburu Counties) have the potential to become increasingly fragmented.
5.	Hunting	• Historically, the killing of Grevy's zebra for skins. • Currently hunting is for meat and the use of Grevy's zebra fat in traditional medicine. • Armed herders also use Grevy's zebra for target practice.	• El Barta, North Horr, South Horr and Tsavo area.
5.	Disease	• Poor body condition as a result of competition for resources and a lack of pasture and water. • Unvaccinated livestock expose both domestic stock and wildlife to diseases. Populations occurring in low numbers are particularly susceptible. • Frequency of emerging /re-emerging diseases is on the increase due to increasing interactions between wildlife and livestock and increased climatic variability.	• All Grevy's zebra populations (Isiolo, Laikipia Marsabit and Samburu Counties).
5.	Predation	• Top-heavy predation of Grevy's zebra specifically by lions and hyenas impact Grevy's zebra population growth.	• Indirect evidence suggests this is happening at LWC and OWS.

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Grevy's zebra lactating females and foals on the Naibelibeli plains of Westgate Community Conservancy

Challenges to addressing threats: the wider context

All the major threats facing Grevy's zebra are symptomatic of the underlying driver of increasing human and livestock populations and their expansion into rangelands.

Rapidly increasing human populations; poverty; sedentarisation of historically semi-nomadic communities around permanent infrastructure that deliver critical services such as education and health; a breakdown in traditional governance as modern lifestyles are adopted by younger generations leading to the loss of traditional knowledge and ways of managing natural resources; increased demand for energy (fuel wood and charcoal) and other complex socio-economic and cultural factors are the major underlying drivers of land degradation.

These factors are putting enormous pressure on scarce resources and make it harder to effectively control the spread of settlements, the use of water points and seasonal grazing management. This is especially the case for small stock (sheep and goats) which create localised degradation and increase the risk of insecurity and conflict. Degradation is also being driven by demand for resources from urban centres. In many areas, there has been a rapid change of tenure and land use in Grevy's zebra range, from communal to private ownership. The associated land subdivision, fencing and conversion of land use (particularly to agriculture, infrastructure and urban development) is not only a threat to existing core areas used by Grevy's zebra, but also threatens the stability of migratory corridors.

Land degradation and changes in land use increases the likelihood of human-wildlife conflict, particularly during dry seasons and droughts where acute water shortages and inadequate dry season pasture severely affect wildlife, livestock and humans. Over the past ten years, increased incidents of human-wildlife conflict have been attributed to human activities extending into areas originally preserved for wildlife. Climate change exacerbates many of these underlying drivers by increasing the frequency of extreme events.

During the workshops, stakeholders emphasised that whilst political goodwill towards conservation activities and organisations exists in many regions, the government currently only has a limited impact on mitigating larger threats. This is owing to a lack of human and technical resources and limited control of illegal weapons in areas of conflict and insecurity.

Grevy's zebra conservation efforts in Kenya

Since 1998, Grevy's zebra conservation efforts have significantly increased and expanded. With more than 99% of Grevy's zebra range falling outside protected areas, Grevy's zebra became a focal species for community-led conservation programmes. In the early to mid-2000s, investment was made into a small number of community conservancies that were considered critical range for Grevy's zebra. Today, there are a total of seventeen community conservancies and three county conservancies established across Grevy's zebra range in northern Kenya (see http://www.nrt-kenya.org).

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 diversifying their economic base through wildlife-based income such as tourism, which are key elements of ensuring the long term sustainability of these programmes.

The initial focus for conservation efforts was on Samburu County in the central and eastern part of the county. However, since 2008, these efforts have expanded to include Samburu North and parts of Marsabit County. They include communities that do not have a formal conservancy structure. Stakeholders in Laikipia County have recently focused more attention on Grevy's zebra as the population in this area has significantly increased over the last five years.

The role of county governments in Grevy's zebra conservation is also critical, especially as the national reserves are an essential refuge for the species. County governments have demonstrated their support in providing funding for, and participating in, the GGR. They have also made informal commitments to conservation recommendations arising from the results of this census. Recognition of Grevy's zebra as a flagship species in the landscape will help to secure inclusion of its conservation and management in County-Integrated Development Plans (CIDPs), as well as national level infrastructure projects.

Approach to the new recovery and action plan

The past ten years of strategic focus have seen significant progress both in the management of conservation efforts and the impact of coordinated activities. The success of the first two strategies in targeting a reduction in population decline and stabilising core breeding units within the metapopulation is directly related to the implementation of a coordinated plan of action. Major achievements of implementing the 2012-2016 strategy are listed in Annex 3. The current action plan is taken forward by the same dedicated and highly collaborative group of individuals and organisations represented in this document. For the current action plan, the guiding vision and goal remain unchanged (Figure 5). This is because they continue to serve the species conservation mandate well.

Vision: To have viable populations of Grevy's zebra in their natural habitat, functioning in healthy ecosystems and valued locally and globally.

Goal: To ensure increasing populations of Grevy's zebra and work towards fostering ecological, socio-cultural and economic sustainability within their natural range.

In the new action plan, there will be two main operational changes:

1. A ten-year recovery and action plan.

There are two phases in the development and implementation of any conservation and management strategy. The first is a crisis management phase when it is initially realised that a strategic focus is required. At this point the stakeholders working towards the species preservation rally together and work toward common strategic objectives designed to arrest the main threats affecting the decline in population size. In this first phase, activities are reactive to begin with and require a highly adaptive approach to achieving their goals. If successful, a change in the population trends will be observable. The second phase moves activities toward more proactive outcomes. These include (1) securing and rehabilitating rangelands making them suitable for human and wildlife coexistence once again; (2) developing legislative and policing systems that can be implemented to protect wildlife populations; (3) instilling a culture of preservation and natural resource conservation in local communities that share the landscape with wildlife and (4) allowing these communities to take ownership of, and benefit directly from, their investment in and tolerance of wildlife.

Phase one requires more regular redressing of strategies and activities to enable them to be rapidly adaptive to the changing conditions experienced as the conservation challenge is addressed. Phase two takes a longer view, allowing systems and people to become embedded. It strives to build a legacy of conservation practice owned and perpetuated by local communities engaged in and responsible for the welfare of their landscape and the species and ecology it contains.

In the first two strategies, we addressed the crisis of population decline. Some population stabilisation has been achieved and these successes are being built upon. As this new recovery and action plan unfolds over a ten-year period, it will be regularly reviewed and adapted based on reassessments of its strategic objectives, the successes of conservation activities and the challenges met in its implementation.

2. A three-year strategic review interval.

Owing to the extended period of the action plan's implementation, it is important to remain alert to changes in the threat landscape and conservation status for Grevy's zebra. An adaptive approach will be adopted whereby the GZTC meets biannually, with additional meetings called as required, to ensure that annual targets are being met. Formal strategic reviews will be conducted every three years (2019, 2022 and 2025) during the action plan's ten-year period to monitor successes and pre-emptively deal with emerging threats. Each review will allow conservation activities to be fine-tuned or re-directed as required. This will be in the form of strategic directives which can be appended to the action plan to facilitate its implementation and support adaptive management.

Strategic Objectives

Revision of Strategic Objectives in the 2017-2026 recovery and action plan

SOs 1-5 were listed in the expired 2012-2016 strategy. SO 6 is new and has been added to this revised action plan to highlight the need to mitigate the negative impacts of massive infrastructural development on Grevy's zebra populations in northern Kenya. Although activities addressing this threat were included under SO 3 in the previous strategy, the threat review identified infrastructure development as potentially one of the most severe threats the species may face as Kenya races to meet the goals of its Vision 2030 development plan (Government of Kenya 2006). SO 6 was added to emphasise the urgency of this threat and to ensure that activities designed to mitigate this threat can be more clearly defined and coordinated. Activities addressing conflict and insecurity, which in the 2012-2016 strategy fell under SO 4, have been moved to SO3 and expanded and strengthened to address conflict and insecurity that are the result of migration due to extreme weather events and localised rangeland degradation.

The recovery and action plan has a ten-year life span and six SOs:

SO 1: Coordination of the implementation of the recovery and action plan.

SO 2: Enhancement of stakeholder partnerships in Grevy's zebra conservation.

SO 3: Enhancement of Grevy's zebra conservation and habitat management.

SO 4: Monitoring and management of Grevy's zebra population health.

SO 5: Enhancement of inter-regional Grevy's zebra conservation.

SO 6: Minimise the potential negative impacts of infrastructure development on Grevy's zebra habitat and populations.

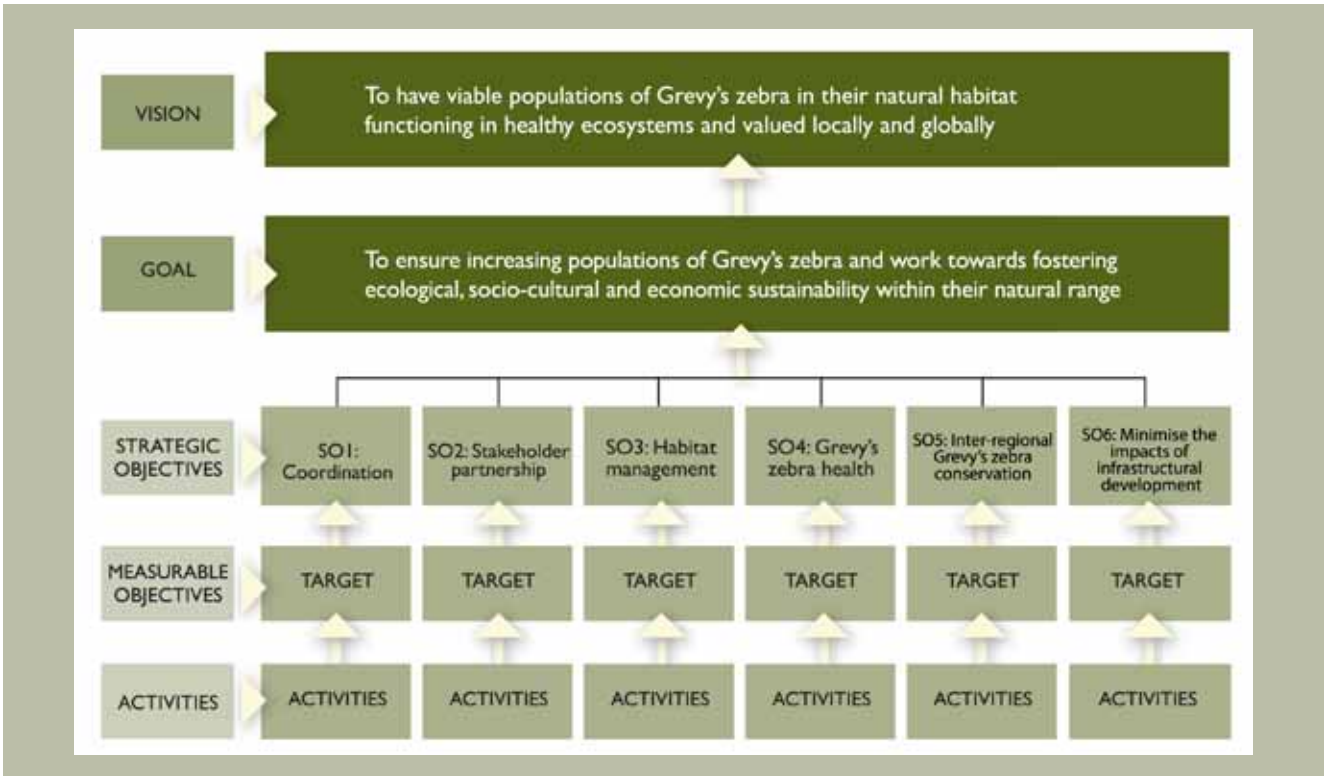

Figure 5. *The structure of the revised 2017-2026 recovery and action plan.*

Strategic Objectives: rationale and implementation

SO 1: Coordination of the implementation of the recovery and action plan

Rationale

There are multiple stakeholders involved in Grevy's zebra conservation activities across the country. A coordination framework ensures that duplication of effort is avoided, resource use is optimised and synergies between different conservation efforts are promoted. Coordination also enables information and lessons learned on Grevy's zebra conservation to be shared more effectively between stakeholders. Finally, coordination ensures that implementation complies with legislative requirements, policy prescriptions and international conservation standards.

The coordination framework for the 2017-2026 action plan represents the functional structure that is currently working, with implementation being overseen by Kenya Wildlife Service (KWS) with the support of the GZTC and other stakeholders working on the conservation and management of Grevy's zebra and their habitat. Communities could not sustain site committee implementation during 2012-2016 and so this has been discontinued in favour of direct engagement with community stakeholders by GZTC members.

In order to enhance coordination, data-sharing and joint outputs among Grevy's zebra conservation stakeholders, Memoranda of Understanding (MOUs) will be developed on national level projects, including the stripe-identification database, collaring and the GGR. Ensuring all organisations have access to the IBEIS/WildBook (Berger-Wolf *et al.* 2017) system for stripe-identification (ID) will be prioritised within the first three years of this new action plan (Table 3).

SO 2: Enhancement of stakeholder partnerships in Grevy's zebra conservation

Rationale

Grevy's zebra management and conservation requires effective partnerships with local communities, private landowners, government agencies and other relevant stakeholders (Williams and Low 2004). Under this updated strategy, Grevy's zebra conservation and management will be promoted through partnerships to develop a sustainable resource and management capacity amongst the diverse Grevy's zebra stakeholders.

During the last ten years, increasing numbers of Grevy's zebra have been observed in Laikipia County and it is now considered a stronghold for the species (Berger-Wolf *et al.* 2016). Targeted and increased effort of Grevy's zebra conservation and management in Laikipia County will be enhanced under this SO. New stakeholder partnerships will be developed and existing partnerships strengthened. Although Grevy's zebra are fluid in their movements as they search for secure grazing and water resources, traditionally, Laikipia has been the southern extreme of their range and has held only a small percentage of the population. Rangeland degradation in Samburu County and the resulting lack of pasture and water, in addition to insecurity, are some of the factors that are likely to have contributed to the shift in distribution. Some Grevy's zebra conservation partners already operate within the region. Activities in the new strategy aim to increase collaboration and information sharing with private land owners, which is particularly important in light of the recent insecurity related threats impacting Grevy's zebra in this region.

Partnerships with Ethiopian conservation entities, originally addressed in this SO in the 2012-2016 strategy, have been included under SO 5.

Roles of stakeholders

i. Central government and county government

This refers to all levels within the Government of Kenya, including the Office of the President and Ministries 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. KWS is ultimately responsible for the implementation and monitoring of this recovery and action plan for Grevy's zebra. National reserves, managed by county governments, are critical refuges for Grevy's zebra and supporting their management will be strengthened under this SO.

ii. Communities

Community stakeholders in northern Kenya comprise of the following ethnic groups: Samburu, Turkana, 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 action plan. 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.

Table 3. *SO 1: Coordination of the implementation of the recovery and action plan.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 1.1 Communication	1.1.1 Synthesise and disseminate all research findings on Grevy's zebra Conservation	Summaries on research findings	National population	Continuous	GZTC, stakeholders, research institutions
SO 1.2 Administrative structure	1.2.1 Finalise the reviewed draft of the Recovery and Action Plan for Grevy's Zebra 2017-2026	National action plan document	National population	June 2017 - May 2018	KWS, GZTC
	1.2.2 Launch the Grevy's zebra action plan	Grevy's zebra action plan launched	National population	June 2018	KWS, GZTC
	1.2.3 Convene site committees for each region for each review process (every three years)	Site committees convened for each review	Wamba, Laikipia, El Barta & other small Populations	2019, 2022, 2025	GZTC, stakeholders
	1.2.4 Reassess the role of the GZLO	Functional GZLO Office	National population	December 2018	GZTC
	1.2.5 Liaison between the GZTC and Executive Committee	Effective and efficient communication achieved	As needed	Continuous	Executive Committee, GZTC
SO 1.3 Enhance data management	1.3.1 Consolidate, review and report back regularly on findings to stakeholders	Biannual progress reports	National population	Continuous	GZLO
	1.3.2 Development of MOUs for GZTC members to access stripe-ID data once transferred to IBEIS/Wildbook and data on collared individuals	MOUs developed	As needed	January 2019	GZTC
	1.3.3 Ensure functioning IBEIS/ Wildbook national Grevy's zebra database for population-level monitoring using stripe-IDs	Functional database for national population	National population	January 2019	GZTC
SO 1.4 Monitoring and evaluation	1.4.1 Prepare annual implementation status reports	Annual reports prepared and shared; Annual Grevy's zebra conference convened	National population	Annually	GZLO
	1.4.2 Prepare progress reports on implementation and share with stakeholders and vice versa	Progress reports prepared and shared; Annual Grevy's zebra conference convened	National population	Annually	GZLO, GZTC, stakeholders
SO 1.5 Resource mobilisation	1.5.1 Develop joint projects and funding proposals for implementation of the action plan	Successful joint projects undertaken	As needed	Continuous	GZTC, stakeholders, research institutions
	1.5.2 Initiate and publicise Grevy's zebra awareness events	National and local events publicised	As needed	Continuous	GZTC, stakeholders
	1.5.3 Enhance collaboration with local and international institutions	Meetings held, workshops organised, proceedings and minutes produced	As needed	Continuous	GZTC, stakeholders

iii. 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.

iv. 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 in Laikipia County. Most 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 recovery and action plan and their involvement in its implementation is crucial.

v. Tourism sector

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

vi. Research/Academic Institutions

The effectiveness of this strategic plan will 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.

vii. 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.

Table 4. *SO 2: Enhancement of stakeholder partnerships in Grevy's zebra conservation.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 2.1 Enhancement of stakeholder partnership in Grevy's zebra conservation	2.1.1 Develop income generating activities	No of ecotourism projects/ facilities; Increased income/alternative economic opportunities for local communities	As needed	Continuous	GZTC, LWF
	2.1.2 Recruit and train community scouts where the need is identified	Number of scouts employed and trained	As needed	Continuous	GZTC, county government
	2.1.3 Initiate (and sustain) grazing management committees	No. of committees initiated	As needed	Continuous	GZTC, county government
	2.1.4 Document local knowledge about Grevy's zebra and conservation issues	Reports produced	As needed	Continuous	GZTC, community stakeholders
	2.1.5 Enhance collaboration with local and international research institutions	Meetings held, workshops organised, proceedings and minutes produced	As needed	Continuous	GZTC, stakeholders, research institutions
	2.1.6 Needs assessment and capacity building	Capacity building needs addressed	As needed	Continuous	GZTC

SO 3: Enhancement of Grevy's zebra conservation and habitat management

Rationale

This SO looks at securing Grevy's zebra habitat where their current status can be maintained or enhanced with effective adaptive management. This SO will focus on proper land use planning and management and aims to address the primary threats to Grevy's zebra including rangeland degradation, competition for resources including lack of access to water, increased insecurity and conflict and localised Grevy's zebra population loss leading to small populations. SO 6 addresses habitat conversion and loss.

Activities under this objective will promote land use planning, including grazing regimes, to ensure that land degradation is mitigated against and that pasture is improved. Securing grazing and water resources and addressing the escalating land degradation in northern Kenya are critical to the long-term survival of the species.

Activities addressing conflict and insecurity have been expanded under this SO. The potential negative impacts of this threat on security, governance stability, wildlife populations and rangelands were demonstrated in Laikipia County in 2017. Extreme drought in other counties created a mass movement of pastoralists and their livestock from these counties into Laikipia to access pasture and water resources available on large private ranches that occupy a significant percentage of the land in Laikipia and some community ranches. Competition for resources, exacerbated by the presence of illegal weapons and poor governance, led to increased poaching in normally secure areas, and limited ability to track and monitor Grevy's zebra numbers due to insecurity.

i. Rangeland degradation

Rapidly increasing populations, sedentarisation, land conversion, migration and climate variability is leading to increasing numbers of livestock reliant on fragmenting and degrading rangelands. Holistic land and livestock management, an approach that establishes grazing regimes that take advantage of high densities of livestock as a tool for restoring health to degraded land (Savory and Butterfield 1999) will be promoted under this SO. Concurrently, implementing local land use planning, establishing rehabilitation sites, reviving traditional natural resource management structures and expanding conservation clubs that are already proving successful should revitalise rangelands if done at scale, and result in healthy ecosystems that support both Grevy's zebra and community livestock in the long-term. Mitigating the causes that lead to increased rangeland degradation will go a significant way in limiting localised Grevy's zebra emigration and improving their survival to support population growth.

Short-term management actions to mitigate the impact of rangeland degradation on Grevy's zebra, such as supplementary feeding of Grevy's zebra during droughts, will also be vital in maintaining population numbers (see SO 4).

ii. Lack of 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 (Rowen 1992; Williams 1998; Nelson and Williams 2003). Lactating females must drink water daily (Becker and Ginsberg 1990; Rowen 1992). In areas of high livestock density the resulting monopolisation of water sources and the pasture around them by livestock often prevents lactating females from accessing water during the day and forces them to graze far from water (Nelson and Williams 2003). As a result of moving considerable distances to access water, 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).

iii. Increased conflict and insecurity

As rangeland health erodes, the structures that maintain peace among ethnic groups and communities that live alongside Grevy's zebra also disintegrate. Pastoralists emigrate further afield seeking water and grazing resources for their livestock, coming into contact with different ethnic groups and other categories of land users. This includes large private land owners, government reserves and national parks. The resulting increasing competition for limited resources leads to human-human conflict and wider insecurity. Access to illegal weapons and the need for migrating communities to sustain themselves using bush meat increases the vulnerability of Grevy's zebra to poaching. A focus on limiting community emigration through improving rangeland health and water access and availability, will contribute toward addressing the wider threat of conflict and insecurity.

Table 5. *SO 3: Enhancement of Grevy's zebra conservation and habitat management.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 3.1 Improve and maintain Grevy's zebra habitat	3.1.1 Proper land use planning (settlement, tourism, water, core areas, grazing etc.)	No. of approved and implemented land use plans, including planned grazing and settlement strategies	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, county governments, Samburu Trust
	3.1.2 Revive traditional natural resources management structures or institutions	No. of communities with traditional resource management structures in place	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, county governments, Samburu Trust
	3.1.3 Plan holistic grazing in conjunction with water development/use (see SO 3.2)	No. of grazing plans developed and implemented; Increased plant cover; Reduced moribund grass biomass (LWC); Acreage of bare ground treated with mobile livestock *bomas*; Number of grass banks established and maintained	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, LWF, private landowners, county governments
	3.1.4 Site rehabilitation: clear invasive species, harvest native grass seed (create seed banks), re-seed important grass species	Acreage cleared; Acreage re-seeded; Number of sacks of grass seed harvested; Guidelines developed on best-practice for site rehabilitation	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, county governments
	3.1.5 Manage soil erosion	No. and length of gullies healed; Acreage of bare ground restored	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, county governments
	3.1.6 Implement training on range management, inclusive of women, morans, herders and elders	No. of participants trained; No. of distinct areas in which training has been conducted	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, county governments
	3.1.7 Encourage expansion of Grass Guardians clubs	No. of Grass Guardians clubs started and sustained	Community conservancies	Continuous	Community conservancies (supported by GZTC)
	3.1.8 Expand and maintain vegetation monitoring	No. of sites monitored; No. of reports generated on vegetation conditions	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, research institutions
	3.1.9 Identify, map and ensure integrity of key Grevy's zebra habitats, especially foaling areas	Map of potential areas to secure; Acreage of new areas secured	National population	October 2018 & then assessed for each review period	GZTC
SO 3.2 Increase and maintain access to water	3.2.1 Identify and map key dry season water sources for Grevy's zebra	Report produced	Isiolo, Laikipia, Marsabit and Samburu Counties	December 2018	GZTC
	3.2.2 Engage communities to provide access to water for wildlife	No. of communities engaged to provide access to water for wildlife	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, Milgis Trust, private landowners, communities, conservancies, county governments

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
	3.2.3 Identify options for increasing water accessibility and availability in the short-term e.g. digging wells	No. of wells dug	Isiolo, Laikipia, Marsabit and Samburu Counties	As needed	GZTC, Milgis Trust, Samburu Trust, private landowners, communities, conservancies, county government, national reserves
	3.2.4 Identify options for increasing water accessibility and availability in the long-term e.g. troughs, dams, boreholes and sand dams	No. of water sources managed for accessibility and availability; No. of plans with water points for people, livestock and wildlife; No. of WRUAs supporting water management for wildlife	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	GZTC, Milgis Trust, private landowners and conservancies, county governments
	3.2.5 Assessment of Milgis flooding threat	Assessment report with recommendations	Laisamis	December 2019	GZTC
	3.2.6 Utilise opportunities presented by providing health centres (eye clinics) and water to communities	No. of opportunities where provision of health services also provides opportunities to provide water for wildlife used	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	Milgis Trust, Samburu Trust, Sasaab lodge, LWC
SO 3.3 Reduce displacement of Grevy's zebra and conflict and insecurity as a result of people and livestock migrating for resources (pasture and water)	3.3.1 Better trading, leasing and marketing of pastoralist cattle	Increase in value of pastoralist cattle	Laikipia County	Continuous	MRC
	3.3.2 Provision of basic infrastructure (water, health, education, security, roads) to support planned settlements	Basic infrastructure needs identified and addressed through CIDPs	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	County governments
	3.3.3 Develop a structure for elders and morans to work with the receiving host locations on planning and trust building	No. of working structures developed; No. of potential conflict reduced; No. of agreements reached	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	Migrating communities, private and community landowners, county governments
	3.3.4 Build good relations between private landowners and neighbouring communities	No. of potential conflict reduced; No. of agreements reached	Laikipia County	Continuous	Private and community landowners, county governments
	3.3.5 Reduce conflict in national parks and reserves through: • Regenerative grazing to revitalise rangelands to provide temporary grazing resources • Strategies for temporary and flexible grazing	Acreage restored	Isiolo, Laikipia, Marsabit and Samburu Counties	Continuous	County governments, KWS, national reserves
SO 3.4 Reduce the negative impact of conflict and insecurity on rangelands and Grevy's zebra	3.4.1 Continuous training of community scouts/rangers in wildlife protection	No. of trainings on wildlife protection	As needed	As needed	GZTC, county governments
	3.4.2 Employ and equip community scouts in areas where illegal killing of Grevy's zebra is a threat	No. of staff employed and equipment acquired	As needed	As needed	GZTC, county governments

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
	3.4.3 Increase education and awareness in Grevy's zebra in areas where illegal killing is a threat	No. of education and awareness activities	As needed	As needed	GZTC, county governments
	3.4.4 Develop inter-tribal councils that mix age, gender and roles	No. of inter-tribal councils established	El Barta and other sites as needed	Continuous	GZT, other site-based NGOs, county governments
	3.4.5 Implement festivals to celebrate shared identities	One festival in El Barta	El Barta and other sites as needed	December 2017	GZT, county governments
	3.4.6 Develop and implement conflict mitigation by facilitating morans to move to foras using peace as an entry point and advising other morans on local laws for wildlife and grazing	No. of visits to foras by morans	El Barta and other sites as needed	Continuous	GZT, other site-based NGOs, law enforcement agencies, county governments
	3.4.7 Develop and implement conflict mitigation by developing cattle markets to increase options for mitigating conflict (sell rather than fight for cattle)	No. of cattle markets developed	El Barta and other sites as needed	Continuous	County governments
	3.4.8 In the absence of KWS presence, engage relevant authorities in law enforcement (police) and develop acceptance of informal cultural norms as a form of regulation	No. of intended poaching incidents prevented	El Barta and other sites as needed	Continuous	GZT, other site-based NGOs, law enforcement agencies, county governments

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SO 4: Monitoring and management of Grevy's zebra population health

Rationale

Ultimately the long-term survival of Grevy's zebra will hinge on not only stabilising population declines but on promoting population growth. Maintaining body condition is critical for Grevy's zebra because as their body condition declines, they become more susceptible to disease and predation. Competing for pasture and water promotes a loss of body condition in Grevy's zebra which not only lowers survival of both adults and foals but decreases the likelihood of successful reproduction. Droughts can have a particularly severe effect on Grevy's zebra survival.

Activities under this SO are aimed at monitoring Grevy's zebra population dynamics and distribution and maintaining the health of Grevy's zebra populations. Under the 2012-2016 strategy, enormous progress was made in developing a number of guidelines to address disease in Grevy's zebra and to enhance understanding of disease and epidemiology in free ranging Grevy's zebra. Research assessing the role of disease in Grevy's zebra population dynamics will continue to be strengthened under this SO.

Additionally, the outbreak of anthrax in Wamba 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. This was achieved during the last strategy. 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. In the long-term, the recurring annual expense of vaccinating livestock should be incorporated into the conservation plans for Grevy's zebra and supported by government-subsidised livestock health and livelihood programmes. In particular, this activity should be focused on livestock in areas of high Grevy's zebra densities, such as Wamba. Addressing land degradation (included in SO 3) is another long-term measure that will help to minimise disease outbreaks such as anthrax. Increased grass cover reduces the risk of animals ingesting anthrax spores from exposed soil during periods of drought.

Preventing the occurrence of Grevy's zebra existing in small populations is also critical to long-term population health. Maintaining the integrity of Grevy's zebra habitat, including migration corridors, is key to this. Research on the impact of predation on Grevy's zebra was strengthened under the last strategy and will continue.

Supplementary feeding of Grevy's zebra during drought

Table 6. *SO 4: Monitoring and management of Grevy's zebra population health.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 4.1 Disease	4.1.1 Monitor relevance of action plan and guidelines developed on disease at each review period and revise where necessary	Guidelines discussed and reviewed if necessary: • Action plan for disease response and surveillance • Guidelines on disease surveillance and outbreak investigation • Guidelines on the handling of biological samples • Guidelines on disease management and control • List of important diseases and conditions in Grevy's zebra	National population	2019, 2022, 2025	DRC
	4.1.2 Review listserv of experts on diseases in Grevy's zebra and stakeholders in Grevy's zebra conservation to ensure it is current	Listserv reviewed	National population	2019, 2022, 2025	DRC
	4.1.3 Target research to address identified knowledge gaps in Grevy's zebra disease research	No. of research projects supported	National population	Continuous	DRC
	4.1.4 Workshop to review information on Grevy's zebra diseases and other factors limiting the population	Workshop held	National population	2022	DRC
	4.1.5 Annual vaccination for livestock in Grevy's zebra disease hotspots (Anthrax)	Successful vaccination annual exercise	As needed	As needed	DRC
SO 4.2 Health	4.2.1 Supplement feeding in extreme conditions for populations to be defined in poor health	No. of supplementary feeding events	As needed	As needed	GZTC
SO 4.3 Predation	4.3.1 Support ongoing research on effect of predation on Grevy's zebra	No. of research projects supported	As needed	As needed	GZTC
	4.3.2 Work closely with the carnivore task force to identify appropriate predator management in populations known to be limited by predation	No. of appropriate predator management interventions	As needed	As needed	GZTC
SO 4.4 Population monitoring	4.4.1 Update and refine Grevy's zebra distribution map, verifying reports of Grevy's zebra in areas occurrence is unconfirmed	Grevy's zebra distribution map refined for Kenya and Ethiopia	Regional population	June 2019	GZTC
	4.4.2 Monitor trends of population numbers and distribution using aerial surveys	Reports produced	National population	After each survey	GZTC
	4.4.3 Monitor population demography and vital rates using GGR census results, stripe-ID monitoring and other appropriate methods	Reports providing population estimates and vital rates produced	National population	Continuous & GGR (2018, 2020, 2022, 2024, 2026)	GZTC, GGR organising committee

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
	4.4.4 Community/ranger-based monitoring continued and expanded	No. of areas community-based monitoring expanded in to	As needed	As needed	GZTC
	4.4.5 Camera Trap monitoring continued and expanded	No. of camera traps projects	As needed	As needed	GZTC
SO 4.5 Connectivity	4.5.1 Future deployment of GSM collars based on a review of past data	No. of GSM collars installed and successful in providing data	As needed	As needed	GZTC
	4.5.2 Identify areas where connectivity of Grevy's zebra range is critical and possible	No. of connectivity areas identified	National population	As needed	GZTC
	4.5.3 Develop partnerships/ conservancies with communities or landowners in areas identified as critical for connectivity	No. of partnerships developed in identified connectivity areas	As needed	As needed	GZTC
SO 4.6 Small populations	4.6.1 Review 'Guidelines on the number and demographic structure for a viable founder population to re-establish Grevy's zebra in their natural range' to ensure it is current	Guidelines reviewed	National population	2022	GZTC
	4.6.2 Translocation of additional animals to ensure existing small, breeding populations are viable, following guideline implementation in each case	No. of Grevy's zebra translocated to supplement small populations	As needed	As needed	GZTC
	4.6.3 Assess the vulnerability of small populations to disease and reduced gene flow	No. of populations assessed	As needed	As needed	GZTC
	4.6.4 Design metapopulation management plans for source (breeding) and sink (receiving) populations	Plan developed	National population	As needed	GZTC

SO 5: Enhancement of inter-regional Grevy's zebra conservation

Rationale

Regional collaboration between Ethiopia and Kenya is critical for the long-term conservation of Grevy's zebra, especially along the border 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 recovery and action plan will be to strengthen both regional links with Ethiopia and monitoring of transboundary populations.

The revision of the Ethiopia National Equid Action Plan (Ethiopian Wildlife Conservation Authority and IUCN/SSC Equid Specialist Group 2017) in 2016 provides a strong platform on which to build collaborative effort for the inter-regional conservation of Grevy's zebra. A number of activities outlined in the Ethiopian action plan logframe for achieving Grevy's zebra conservation (Annex 4) are aligned with similar activities being carried out in Kenya. There are opportunities for collaboration under objectives 1, 2 and 4 of the Ethiopian action plan. Kenyan stakeholders engaged in the conservation and management of Grevy's zebra have experience in engaging communities to strengthen community policing and monitoring of Grevy's zebra, as well as managing rangelands and securing water access. Kenyan stakeholders could therefore support Grevy's zebra conservation in Ethiopia through training workshops and technology transfer.

Table 7. *SO 5: Enhancement of inter-regional Grevy's zebra conservation.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 5.1 Establish inter-regional committee	5.1.1 Establish an inter-regional committee	No. of meetings held	Regional population	2020	EWCA, KWS, GZTC
	5.1.2 Review inter-regional sections of Kenyan and Ethiopian action plans to ensure cross-regional activities are coordinated	Review conducted	Regional population	2022	EWCA, KWS, GZTC
SO 5.2 Monitoring and information sharing on transboundary population	5.2.1 Monitor the population across the border and develop a shared database and collaborative information sharing mechanism	Functional database established; Information sharing protocol with MOU established	Transboundary population	Continuous	EWCA, KWS, GZTC
	5.2.2 Establish transboundary connectivity of Grevy's zebra population by identifying corridors	Corridors identified and mapped	Transboundary population	2022	EWCA, KWS, GZTC
SO 5.3 Capacity building and resource mobilisation	5.3.1 Develop joint capacity building exercises	No. of capacity building workshops held	Regional population	As needed	EWCA, KWS, GZTC
	5.3.2 Develop initiatives for joint resource mobilisation (census and capacity building)	No. of joint resource initiatives developed and successful	Regional population	As needed	EWCA, KWS, GZTC

SO 6: Minimise the potential negative impacts of infrastructure development on Grevy's zebra habitat and populations

Rationale

Vision 2030 promotes a Kenya that is connected via an expansive network of linear infrastructure including roads, rails, powerlines, and pipelines (Government of Kenya 2006). The Kenyan government is currently developing two transboundary economic growth corridors – the Northern Economic Corridor, and the Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor. These corridors intersect with the most biodiversity-rich landscapes in Kenya, including the Greater Tsavo Ecosystem and the Ewaso Ng'iro Basin. The proposed linear infrastructure under LAPSSET bisects the Grevy's zebra's core range in two areas of northern Kenya, and thus has the potential to significantly impact Grevy's zebra populations by blocking corridors and fragmenting critical habitat for the species. Stakeholders in Grevy's zebra conservation recognise the importance of development in this landscape for the economic advancement of Kenya and its people. Constructive engagement with planning and development authorities to jointly explore best-practice mitigation measures has therefore been prioritised in this action plan, to ensure optimal outcomes for the long-term survival of Grevy's zebra.

Isiolo dam, proposed to be built near Oldonyiro at crocodile jaws (Nkutuk Elkinyang) along the Ewaso Ng'iro River is one of many proposed mega dams being built to meet the goals of Kenya's Vision 2030. The Ewaso Ng'iro River is a vital water source for Grevy's zebra in the Wamba region, supporting a large percentage of the country's total population. The dam is likely to significantly alter water flow within the river and submerge a large area of habitat that Grevy's zebra depend on. Each year, the amount of water available downstream is predicted to reduce by more than 50% (Vilela and Bruner 2017). Aside from the negative impacts on wildlife, the economic losses resulting from the impacts of the dam on the surrounding and downstream ecosystems have been estimated at USD 13 million per year (Ksh 1,333,799,821) for the livestock sector and USD 8 million per year (Ksh 820,799,890) for the tourism sector (Vilela and Bruner 2017). This is likely to lead to a loss in livelihoods which will hamper conservation efforts and potentially increase conflict and insecurity.

The first step under this SO will be a workshop to develop an action plan and guidelines which will outline how this partnership and successful dialogue with the development sector will be achieved.

Table 8. *SO 6: Minimise the potential negative impacts of infrastructure development.*

Strategic Objective	Action	Indicator	Target area/ Grevy's zebra population	Time frame	Actors
SO 6.1 Minimise impact of major infrastructure projects on Grevy's zebra habitat and populations	6.1.1 Hold workshop to develop an action plan and guidelines for engaging actors implementing infrastructure development projects	Action plan and guidelines developed	National population	2018	GZTC, stakeholders
	6.1.2 Identify and engage potential partners with experience in spatial planning and engaging actors implementing infrastructure development projects	Partners identified and engaged	As needed	2018	GZTC, stakeholders
	6.1.3 Ensure coordinated collaboration with government ministries and development partners for any infrastructure development	No. consultative meetings attended; No. coordinated development activities	As needed	Continuous	GZTC
	6.1.4 Implement zoning to transform settlement patterns for more effective multiple land uses	Approved land use plan at county government level	As needed	Continuous	GZTC, Samburu Trust, conservancies, county governments
	6.1.5 Lobby relevant authorities involved in planning and development to incorporate conservation considerations into plans	No. of consultative meetings attended; No. of coordinated development activities	As needed	Continuous	GZTC, Samburu Trust, STE, TNC
	6.1.6 Ensure relevant actors draw on the knowledge of Grevy's zebra experts early in the planning stage	No. of consultative meetings attended	As needed	Continuous	County and national government, Ministry of Transport, infrastructural development agencies, GZTC
	6.1.7 Minimise the unintended consequences of development by working and collaborating with scientists, NGOs, private landowners, communities and national and county government	No. of consultative meetings attended; No. of coordinated development activities	As needed	Continuous	County and national government, Ministry of Transport, infrastructural development agencies, GZTC
	6.1.8 Implement solutions to prevent barriers to Grevy's zebra movement e.g. overpasses and underpasses	No. of overpasses and underpasses installed	As needed	Continuous	County and national government, Ministry of Transport, GZTC, STE
	6.1.9 Implement signage and bumps along corridors	No. of areas with signage and bumps installed	As needed	Continuous	County and national government, Ministry of Transport, infrastructural development agencies, GZTC
SO 6.2 Strengthen evidence required to minimise impact of major infrastructure projects on Grevy's zebra habitat and populations	6.2.1 Develop habitat suitability maps to try to avoid development in potentially important habitat areas (linked to 3.1.5)	Final maps produced and distributed to stakeholders	National population	October 2018 and assessed for each review period	GZTC, conservancies
	6.2.2 Identify critical corridors that should be protected to minimise fragmentation	Corridor maps created and distributed	National population	January 2018	GZTC, Samburu Trust, county governments


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Annexes

Annex 1. Population estimates for Grevy's zebra

Table A1. *Population estimates for global, Kenyan and Ethiopian Grevy's zebra populations from the 1970s until 2017.*

Year	Global population	Kenya population	Ethiopia population	Source
Late 1970s	15,000	13,718	1,900	Klingel 1980; Grunblatt *et al.* 1989
1977	-	13,700	-	Dirschl and Wetmore 1978
1988	-	4,278	-	Grunblatt *et al.* 1989
1995	-	-	577	Thouless 1995a, 1995b
2000	-	2,571	-	Nelson and Williams 2003
2003	-	-	110	Williams *et al.* 2003
2004	-	2,000	-	Williams and Low 2004
2008	-	2,400	-	Litoroh *et al.* 2010
2011	2,827	2,546	281	KWS 2012
2012	-	1,897	-	Ngene *et al.* 2013
2016	2,580	2,350	230	Rubenstein *et al.* 2016
2017	-	1,627	-	Ngene *et al.* 2018

** Please note that all sources are included in the references list of the main document.*

Grevy's zebra co-existing with livestock and people in Westgate Community Conversancy

Annex 2. Organisations and participants who took part in the review workshops

To identify threats and activities to mitigate against them, three workshops were held in 2017 which targeted the regional groups described in the introduction (Table 1): (1) Wamba; (2) Laikipia and (3) El Barta. A fourth and final review workshop brought together representatives from each regional workshop, as well as stakeholders representing populations in the 'Other small populations' group (Table A2). Participants reviewed the causes of threats in each region and identified mitigation activities which were used to inform the activities for each SO. Within each workshop, monitoring data on Grevy's numbers and distribution and other available evidence on threats for that region were presented and discussed and threats identified and ranked for importance.

List of organisations who took part in the regional review workshops

The action plan review process was consultative and participatory, and is the result of the collaborative effort of stakeholders that included: Bendera Conservancy, Buffalo Springs National Reserve, El Barta Location Chief, El Karama Ranch, Grevy's Zebra Trust, Kalama Community Wildlife Conservancy, Kalomudang Conservancy, Kenya Wildlife Service, Laikipia Wildlife Forum, Lewa Wildlife Conservancy, Loisaba Conservancy, Marti Assistant Chief, Marwell Wildlife, Meibae Community Conservancy, Melako Community Conservancy, Mpala Research Centre, Nakuprat-Gotu Wildlife Conservancy, Namunyak Wildlife Conservation Trust, Nasuulu Community Wildlife Conservancy, Northern Rangelands Trust, Nyiro Conservation Area, Ol Malo/Samburu Trust, Ol Pejeta Conservancy, Oldonyiro Community Conservancy, Princeton University, Samburu National Reserve, San Diego Zoo, Sera Conservancy and Shaba National Reserve.

Table A2. *Participants in the final strategic review workshop.*

Name	Organisation
Andrew Letura	GZT
Belinda Low Mackey	GZT
Dan Rubenstein	Princeton University & MRC
Francis Gakuya	KWS
George Anyona	KWS
Julia Francombe	Samburu Trust
Julius Lekenit	GZT
Lekuye Uriano	Meibae Conservancy
Linus Kariuki	KWS
Lizbeth Mate	MW
Martha Nzisa	KWS
Mary Mwololo	LWC
Mathew Mutinda	KWS & LWC
Peter Lalampaa	GZT
Richard Kasoo	NRT
Rikapo Lentiyoo	GZT
Sheila Funnell	GZT
Susan Kiringo	NRT
Timothy Kaaria	LWC
Zeke Davidson	MW

Annex 3. Summary of the implementation progress of the expired 'Conservation and Management Strategy for Grevy's Zebra (*Equus grevyi*) in Kenya, (2012-2016)'

This section outlines the results and progress for each SO in the 2012-2016 strategy. For each SO, activities have been included and the progress made in achieving them explained. Status refers to whether the activity was achieved (A), partially achieved (PA) or not achieved (NA).

Table A3. Results and progress on achieving SO activities in the 2012-2016 strategy (KWS 2012).

SO 1: Coordination of the implementation of the conservation and management strategy.

SO	Activities	Status	Results
SO 1.1 Communication	1.1.1 Develop a Grevy's zebra newsletter	NA	• No newsletter developed.
	1.1.2 Synthesise and disseminate all research findings on Grevy's zebra conservation	A	• Annual Grevy's zebra conference held. • GZT held annual workshops disseminating findings from their community monitoring programme.
SO 1.2 Administrative structure	1.2.1 Finalisation of reviewed draft of Grevy's zebra conservation and management strategy	A	• Conservation strategy document produced (KWS, 2012).
	1.2.2 Launch of the Grevy's zebra strategy	A	• Strategy launched.
	1.2.3 Constitute site committees in Grevy's zebra ranges where there are none	NA	• Four new site committees in Tsavo, Meru (Garissa, Mbalambala, Modogashe), Marsabit and Moyale (transboudary) were planned. The GZLO initiated communications with senior wardens in these areas and the research scientist for Tsavo, but no committees were initiated. • Formation of site committees were activities in the last two strategies but were never initiated.
	1.2.4 Review TORs for site committees	NA	• TOR's developed in 2011 were not reviewed.
	1.2.5 Lobby for recognition of GZLO within KWS structure	NA	• Currently the GZLO (and the division, 'Species Conservation and Management' that the GZLO falls under) is not recognised within the KWS organisational structure.
	1.2.6 Liaise with the NGZSC, Executive committee & site committees	PA	• Communication was effective between NGZSC and Executive committee.
SO1.3 Enhance data management	1.3.1 Consolidate, review and report back regularly to stakeholders	PA	• No formal reports have been produced. • GZLO communicates regularly with stakeholders through phone and email.
	1.3.2 Review TORs of NGZSC	NA	• No review has taken place.
	1.3.3 Improve existing Grevy's zebra stripe- ID database	NA	• The national database is functional however data sharing and outputs are not regular and limited by the current set-up. Updating to IBEIS/ WildBook is pending.
SO 1.4 Monitoring & Evaluation	1.4.1 Prepare annual implementation status report	PA	• GZT and MW produced annual reports.

SO	Activities	Status	Results
SO 1.5 Resource mobilisation	1.5.1 Prepare fundraising proposal	A	• Successful proposals for the implementation of strategy activities included proposals that supported the operationalization of Grevy's zebra Liaison office, the supplementary feeding program, the Grevy's Zebra Disease workshop and the GGR.
	1.5.2 Develop joint projects with stakeholders	A	• This has been successful to date and examples include the GGR, completed and ongoing MSc projects (KWS/ MW/ GZT), development of IBEIS/ Wildbook, partnership between GZT and NRT on rangeland management projects and sharing of data on Grevy's zebra mortality and distribution. • Deployment of radio collars for the study of Grevy's zebra movement across LWC, Wamba, Laisamis and South Horr sites. • Joint contributions to the C79 road development submitted to NEMA in 2013. • Geospatial analysis of Grevy's zebra movement in progress.
	1.5.3 Initiate and publicise Grevy's zebra awareness events	A	• Successfully publicised events include the GGR, the Great Grevy's Ball, the GZT camp opening and the Zebra People exhibition.
	1.5.4 Enhance collaboration with local and international institutions	A	• Collaboration between local and international institutions was enhanced and collaborating institutions include community conservancies, conservation organisations (GZT, MW, NRT, Zoos), government organisations (KWS), research institutions (Colorado State University, Imperial College London, MRC, Princeton University, University of Nairobi, University of Southampton and York University Toronto) and private landowners. • As a follow-on to the GGR 2016, the Director General of KWS convened a workshop at MRC involving Grevy's zebra biologists, conservationists and representatives from five county governments where Grevy's zebras live. The workshop explored options that will move the populations from sustainable to increasing and identify actions that the county governors can commit to that will help make this happen.

SO 2: Enhancement of stakeholder partnerships in Grevy's zebra conservation.

SO	Activities	Status	Results
SO 2.1 Enhancement of stakeholder partnerships in Grevy's zebra conservation	2.1.1 Develop income generating activities	A	• GZT's Nkirriten project, Samburu County. • GZT, MW and NRT have employed and trained community scouts in Wamba, El Barta, Laisamis, South Horr and NRT conservancies. • MW women's beading project in Sarima and South Horr. • Tourism facilities present on NRT Community Conservancies.
	2.1.2 Education and awareness	PA	• KWS meetings with communities has included awareness. • No site committee education meetings were held. • MW hold regular community meetings and engages with schools providing conservation lessons, activities and film screenings for the development of conservation awareness. • MW supported two Kenyan MSc students based on Grevy's zebra conservation - both of which now work in Grevy's zebra conservation directly. • GZT printed mock exams for 1,302 children in Samburu and Marsabit. • GZT conducted school outreach visits with 650 students on average per year (2012-2016). • GZT's field management team conducted meetings with an average of 1,473 people per year and GZT's Grevy's Zebra Scouts, Warriors and Ambassadors reached an average of 935 people per year. • GZT supported six secondary school students with Grevy's Zebra Scholarships.

SO	Activities	Status	Results
	2.1.3 Recruit and train community scouts	A	• GZT has 56 community scouts employed. • MW has 19 community scouts employed. • NRT has 385 conservancy rangers employed in conservancies within Grevy's zebra range.
	2.1.4 Develop and gazette participatory land use plans	PA	• Reported under SO 3.1.1
	2.1.5 Initiate (and sustain) grazing management committees	A	• Grazing management committees are present in all NRT conservancies with active rangeland management programs. • Community core groups formed through GZT workshops manage grazing at zone level.
	2.1.6 Hold trans-boundary meetings	PA	• MW and GZT attended the workshop for developing the Ethiopian Equid Action Plan in 2016, during which transboundary issues were discussed.
	2.1.7 Needs assessment and capacity building	NA	• No assessment done.
	2.1.8 Submission of progress reports on implementation	A	• Annual Grevy's zebra conference held.
	2.1.9 Document local knowledge about Grevy's zebra and conservation issues	A	• Local knowledge has been recorded by GZT through interviews with communities and their community monitoring team (Scouts, Warriors and Ambassadors). • GZT conducted 'ngatini' sessions in 2014 and recorded traditional story-telling with Samburu, Rendille and Turkana ethnic groups. These are being made into a film for schools and communities.

SO 3: Enhancement of Grevy's zebra conservation and habitat management.

SO	Activities	Status	Results
SO 3.1 Improve and maintain natural Grevy's zebra habitat	3.1.1 Proper land use planning (settlement, tourism, water, core areas, grazing etc.)	PA	• Management plans have been developed for Lekurruki, Nakuprat-Gotu, Kalama, West Gate, Sera, Melako, Naibunga. Implementation is ongoing, preliminary discussions on future settlement planning for some of these conservancies. Wider consultation and agreement needed on long-term land-use and settlement planning.
	3.1.2 Plan holistic grazing in conjunction with water development/ use	A	• Vegetation monitoring done across the conservancies. Reports available from NRT Rangelands Department. Some concern as to the legitimacy of historical data. • Namunyak - no change. • Melako - no change. • Kalama - dry and wet season grazing planning in place but no change due to increase in livestock. No change in vegetation. • Meibae - increase in vegetation cover on Barsilinga plateau (measured by amount of time livestock spend at their homestead). • Nasuulu - increase in vegetation cover since establishment of grazing blocks and dry/wet season grazing plans. There has been an increase in forage especially during dry seasons (measured by amount of time livestock spend at their homestead). By-laws are being adhered to by the communities. • Nakuprat-Gotu - increase in vegetation cover (measured by the number of livestock grazing the conservancy from neighbouring conservancies without conflict). • Oldonyiro - no change (but is a new conservancy). • LWC - ongoing vegetation monitoring. Forage quality (diversity) has increased.

SO	Activities	Status	Results
	3.1.3 Clear invasive species, re-seed important grass species and harvest native grass	A	• Restoration activities have targeted core habitat areas in the Grevy's zebra range. • Invasive species have been cleared from a number of conservancies but the acreage and exact locations are unknown. Known areas include Nasuulu (56 acres) Oldonyiro (approx. 1,000 acres), Kalama (425 acres) and Westgate (area unknown). • Areas have been re-seeded but the acreage is unknown. • Grass seeds have been collected. The amount and where they were collected from is unknown.
	3.1.4 Manage soil erosion	A	• Meibae - gulley healing has been implemented over 350 acres.
	3.1.5 Identify & map key Grevy's zebra habitats (especially for foaling)	PA	• Identification and mapping of key Grevy's zebra habitats especially for foaling is ongoing. Data from MW, GZT, KWS and GGR report are to be reviewed.
	3.1.6 Expand and maintain vegetation monitoring	A	• NRT conservancies that undertake Veg-CoMMS annual data collection are Il Ngwesi, Lekurruki, Kalama, West Gate, Meibae, Namunyak (Naluwuon) Sera, Biliqo Bulesa, Melako, Oldonyiro (Naapu unit), Naibunga. Reports are available from NRT Rangelands Department. • Data collection techniques have been established, vegetation transects conducted and vegetation conditions are now known for South Horr (George Anyona, MSc). • Other areas remain unknown.
	3.1.7 Implement training on range management, inclusive of women, morans, herders and elders	A	• Since 2012, GZT community workshops held with 3,398 participants (including elders, women and warriors); GZT held a training workshop for 32 herders and school-going children. • Community meeting held in South Horr to discuss grazing strategies and sensitize toward the development of managed grazing plans.
	3.1.8 Use information from monitoring to identify other critical habitats for Grevy's zebra and secure them	A	• Review GGR data, GZT data, NRT Wildlife-CoMMS data, collar data and national stripe-ID database data. • Seasonal spatial analysis of rangeland use in production. • GZT hosted three international MSc projects to investigate Grevy's zebra movement.
SO 3.2 Increase and maintain access to water	3.2.1 Identify and map key dry season water sources for Grevy's zebra	A	• NRT has mapped the majority of perennial water sources, boreholes, dams, springs – focus on people and livestock rather than wildlife. GIS data available from NRT GIS dept. • GZT has mapped critical dry season water sources for Grevy's zebra. GIS data available from GZT. • MW has mapped dry season water resources in the Far North Zone.
	3.2.2 Identify options for increasing water accessibility and availability	A	• Sand dam and dedicated Grevy's zebra water pan constructed by GZT in Laisamis. • Dry season water management by GZT in Laisamis and El Barta every year. • Close monitoring of Grevy's zebra body condition during prolonged droughts was carried out by GZT and additional water provision made to ensure continued access to declining water sources.
	3.2.3 Assessment of Milgis flooding issue	NA	• Not completed.
	3.2.4 Implement key recommendations for Milgis flooding	NA	• Not completed.
	3.2.5 Strengthen coordination of WRUA activities	A	• Leparua, Nakuprat-Gotu, Oldonyiro - WRUAs functioning. • Laisamis – WRUA established in 2015 but progress with WRUA activities has been limited. • Nasuulu - WRUA in the process of forming. • South Horr - WURA to be implemented

SO	Activities	Status	Results
	3.2.6 Lobby for catchment restoration	NA	• No activities undertaken.
	3.2.7 Implement a tree planting campaign	A	• Tree planting continues regularly however number of trees planted and length of river bank restored is unknown. Tree planting may not always be done with Grevy's zebra in mind.
SO 3.3 Minimise impact of major infrastructure projects on Grevy's zebra habitat and populations	3.3.1 Ensure coordinated collaboration with government ministries and development partners for any infrastructure development	A	• General for all Conservancies - controlling establishment of permanent buildings and inform government with awareness of grazing lands and livestock corridors. • Nasuulu - development limited on grazing and core areas. Permanent buildings are only allowed in settlement areas. LAPSSET and Resort City are a key threat in Nasuulu and need to be addressed. • Namunyak - Sarara Valley Development plan - an agreement with county govt was made to assign designated places for each activity.
	3.3.2 Develop habitat suitability maps to try to avoid development in potentially important habitat areas	NA	• Not completed.
	3.3.3 Identify critical corridors that should be protected to minimise fragmentation	NA	• Not completed.

SO 4: Establish a programme for monitoring and managing Grevy's zebra population health.

SO	Activities	Status	Results
SO 4.1 Disease	4.1.1 Develop guidelines on disease surveillance and outbreak investigation	A	• Grevy's zebra DRC was formed to develop guidelines. • Guidelines developed.
	4.1.2 Develop guidelines on the handling of biological samples	A	• Guidelines developed.
	4.1.3 Develop guidelines on disease management and control that includes carcass management	A	• Guidelines developed.
	4.1.4 Develop list of important disease and conditions in Grevy's zebra and brief descriptions	A	• List of important disease and conditions in Grevy's zebra and brief descriptions developed.
	4.1.5 Develop listserv of experts on diseases of Grevy's zebra	A	• Listserv of experts on diseases in Grevy's zebra developed in 2012.
	4.1.6 Identify knowledge gaps in Grevy's zebra disease research	A	• Knowledge gaps identified.
	4.1.7 Proposal to identify critical gaps in the implementation of the DRC's activities	A	• Proposal successful.

SO	Activities	Status	Results
	4.1.8 Workshop on Grevy's zebra diseases and other factors limiting the population	A	• Disease workshop supported by GZT was held in Nanyuki. Report produced.
	4.1.9 Prepare action plan for disease response and surveillance	A	• Action plan developed.
	4.1.10 Annual vaccination for livestock in Grevy's zebra hotspots (Anthrax)	A	• This happened in 2008/ 2009, but not between 2012 and 2016.
SO 4.2 Health	4.2.1 Supplement feeding in extreme conditions for populations defined to be in poor health	A	• Guidelines on supplementary feeding programme (developed by the DRC). • Provision of supplementary feeding of Grevy's zebra during extreme drought appears to have prevented a population decline during the 2011, 2014 and 2016 droughts in Wamba, El Barta, Laisamis and South Horr.
SO 4.3 Predation	4.3.1 Support ongoing research on effect of predation on Grevy's zebra	A	• Research was carried out on the effects of predation on Grevy's zebra in Meru National Park, OWS and LWC. Reports are available.
	4.3.2 Work closely with the carnivore taskforce to identify appropriate predator management in population knowns to be limited by predation	A	• Joint meeting between GZTC and Carnivore committee - recommendations have been produced.
SO 4.4 Hybridisation	4.4.1 Consolidate more information	A	• Reports exist for Laikipia and Tsavo. • Verbal reports have been given to KWS about hybrids in Garissa and Kitui. Reports have not been verified.
SO 4.5 Security	4.5.1 Continuous training of community scouts/ rangers in wildlife protection	A	• GZT's Grevy's Zebra Ambassadors trained at Manyani KWS Law Enforcement Training Academy in 2013. • MW assisting with training and implementation.
	4.5.2 Employ and equip community scouts in areas where illegal killing of Grevy's zebra is a threat	A	• 17 Grevy's Zebra Ambassadors employed and equipped in El Barta (GZT). • NRT and County Conservancy rangers are all equipped.
	4.5.3 Increase education and awareness in Grevy's zebra areas where illegal killing is a threat	A	• Between 2012 and 2016, GZT conducted education and awareness with 4,950 community members and 1,026 schoolchildren in El Barta where poaching is a threat. • GZT conducted a law enforcement workshop with El Barta community members and law enforcement agencies in Maralal (KWS, police, judiciary) to raise local awareness on the penalties for wildlife crime. • Public barazas in Wamba, northern Maralal (KWS).
SO 4.6 Population monitoring	4.6.1 Update Grevy's zebra distribution map	PA	• Updated Grevy's zebra distribution map according to GGR results.
	4.6.2 Establish population estimate-national aerial survey-refine survey method best suited for Grevy's zebra	A	• Population estimates for northern Kenya provided by aerial surveys conducted in 2012 and 2017. Reports are available.

SO	Activities	Status	Results
	4.6.3 Demographic monitoring and population vital rates – Photo ID monitoring continued and expanded	NA	• Data exists to support an analysis (GZT monitoring, GZT camera trap, warrior and scout image data, MW Camera trap data). An analysis is in progress to determine long-term trends based on Stripe-ID database.
	4.6.4 Establish population estimates in key Grevy's zebra areas - ground survey to establish population numbers	A	• Established national Grevy's zebra population estimate from the GGR.
	4.6.5 Community/ ranger-based monitoring continued and expanded	A	• GZT and MW have increased the numbers of scouts they employ and the area monitored. • Community and ranger-based monitoring has expanded.
	4.6.6 Verify reports of Grevy's zebra in areas occurrence is unconfirmed	NA	• Reports have been given by people on the ground but not verified e.g. in Kitui and Garissa.
	4.6.7 GSM collars	A	• GSM collars installed at Leparua in 2013 and Anderi in 2015 and successfully provided data. All collars are now deactivated. Five collars are in storage and awaiting deployment. MW has funds to purchase a further two collars in 2018. Reviews of collaring strategy, goals and objectives required.
	4.6.8 Camera Trap monitoring continued and expanded	A	• Camera trap monitoring continued and expanded in Laisamis, Anderi, South Horr and Ntil areas and expanded in these areas (GZT, MW). • Camera traps are periodically set up in in Wamba and El Barta to monitor dry season water management (GZT).
SO 4.7 Connectivity	4.7.1 Identify areas where connectivity of Grevy's zebra range is possible	PA	• MW data, GGR data and GZLO MSc findings identified South Horr, Kargi and Laisamis as areas where connectivity of Grevy's zebra range is possible.
	4.7.2 Develop partnerships/ conservancies with communities or landowners in areas identified as critical for conservation	A	• New partnerships generated in South Horr and Sarima areas with private tourism ventures and a newly gazetted nature reserve.
SO 4.8 Small Populations	4.8.1 Translocation of additional animals to ensure existing small, breeding populations are viable	A	• Requests were recieved for Grevy's zebra to be added to Meru and OWS. The GZTC determined that these were inappropriate activities for Grevy's zebra conservation and will assess additional areas for translocation. This has been achieved as although no translocations were made, the decision not to translocate animals was made on sound science. • A habitat viability assessment is ongoing for Meru and a predator survey is complete. • An assessment report completed for OWS.
	4.8.2 Develop guidelines on the number and demographic structure for a viable founder population to re-establish Grevy's zebra in their natural range	A	• Guidelines developed on the number and demographic structure for a viable founder population to re-establish Grevy's zebra in their natural range.

SO 5: *Enhancement of transboundary Grevy's zebra conservation.*

SO	Activities	Sub Action/Activities	Status	Results
SO 5.1 Trans boundary management	5.1.1 Identify and engage transboundary stakeholders	Identify the stakeholders (local, national and regional levels)	A	• Kenyan stakeholders participated in the Ethiopia National Action Plan workshop and engaged with stakeholders involved with Grevy's zebra conservation.
		Establish a transboundary Grevy's zebra site committee	NA	• No site committee has been established.
		Initiate cross boarder meeting and conflict resolution mechanisms	NA	• No cross-border meetings have occurred.
		Develop regional and national action plans for the species	A	• Both Ethiopia and Kenya have published national action plans for Grevy's zebra, which include transboundary activities.
	5.1.2 Revision and harmonisation of policies	Review existing policies and legislation	NA	• No review has occurred.
		Signing of transboundary Grevy's zebra agreements	NA	• No agreements have been developed and signed.
	5.1.3 Monitoring and information sharing	Monitor the population across the border and develop a database	NA	• Database development and sharing not achieved. • No reports have been produced.
		Develop collaborative information sharing mechanism	NA	• No MoU has been established.
		Establish transboundary connectivity of Grevy's zebra population (corridors)	NA	• No commitment has been signed.
	5.1.4 Capacity building and resource mobilisation	Develop joint capacity building exercises	NA	• No workshops have been held.
		Develop initiatives for joint resource mobilisation (census & capacity building)	NA	• No joint initiatives have been developed.

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Grevy's zebra lactating female and foal on Lewa Wildlife Conservancy

Annex 4. Ethiopia National Equid Action Plan

Extracted from: Ethiopian Wildlife Conservation Authority and IUCN/SSC Equid Specialist Group. 2017. Ethiopia National Equid Action Plan. Ethiopian Wildlife Conservation Authority, Addis Ababa, Ethiopia.

The Ethiopia National Action Plan workshop was convened by the Ethiopia Wildlife Conservation Authority (EWCA) in Addis Ababa on 12-13 December 2016. The workshop was organised by EWCA and the IUCN/SSC Equid Specialist Group. The main goal of the workshop was to bring together all the key stakeholders and to discuss all the available data relevant for the conservation of African wild ass, Grevy's zebra and Burchell's zebra to determine their current status. This involved identifying all threats and their relative importance per species, establishing the needed actions and objectives, and developing a National Action Plan that would prioritise and coordinate the short and long-term activities that would ensure the survival of these wild equids in Ethiopia.

The workshop was attended by two representatives from Kenya's GZTC. Ethiopia and Kenya share many of the same objectives in their national strategies (Table A4), and some actions from the Ethiopia National Action Plan have been included in this revised action plan under SO 5: Inter-Regional Grevy's Zebra Conservation.

Table A4. *Ethiopia National Equid Action Plan Logframe for Grevy's Zebra (Ethiopian Wildlife Conservation Authority and IUCN/SSC Equid Specialist Group 2017).*

Grevy's zebra **Goal:** To Ensure the increase of Ethiopia's Grevy's Zebra populations and their long-term viability throughout their range				
Objective	**Actions**	**Indicators**	**Timeline**	**Actors**
GZ 1. Protect Grevy's zebra from hunting	1.1. Establish partnerships between law enforcement and implementing agencies	Partnerships established	2-3 years	EWCA
		Agreements signed	2-3 years	EWCA
		Meetings held and minuted	2-3 years	EWCA
		Successful prosecutions	2-3 years	EWCA
	1.2. Raise awareness of anti-poaching and legal protection (local/regional level)	Poaching incidents reduced	2-3 years	EWCA
		National support for wildlife increased		
	1.3. Encourage community policing and processing of poachers	Poaching incidents decreased	2-3 years	EWCA
		Successful prosecutions		
	1.4. Control ownership of firearms	Firearm amnesties	ongoing	Ministry of defense, Law enforcement agencies, EWCA
		Firearm surrender		
		Firearm ownership reduced		
GZ 2. Engage local communities in conservation	2.1. Alternative livelihood actions (ecotourism, home industries)	People employed in alternative livelihood generation	4 years	EWCA, development NGO's
GZ 3. Reduce incidence of road kills	3.1. Provide awareness raising for drivers	Road mortality reduced	ongoing	EWCA, Ministry of Transport
		Awareness programs conducted among key groups	ongoing	
	3.2. Identify collision hotspots	Hotspots mapped	2 years	EWCA, Ministry of Trans.
	3.3. Enact physical road kill reduction activities	Speed breaks installed	4 years	Ministry of transportation
		Overpasses, underpasses and wildlife corridors planned	4 years	Ministry of Transport
	3.4. Place traffic signage along highways	Signs in place	4 years	Ministry of Transport
GZ 4. Improve habitat to secure access to resources	4.1. Assess and quantify existing GZ habitat status	Status and extent of GZ habitats mapped	2 years	EWCA, University of Addis Ababa, IUCN/SSC ESG
	4.2. Develop a rangeland management plan for the Grevy's zebra Range Invasive spp. control etc.	Rangeland management plan published and ratified	3 years	EWCA, University of Addis Ababa, IUCN/SSC ESG
		Participatory rangeland management and resource mapping activities integrated at *kebele* level	3 years	EWCA, University of Addis Ababa, IUCN/SSC ESG

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RECOVERY and ACTION PLAN for
GREVY'S ZEBRA
(Equus grevyi) in KENYA (2017-2026)