MAASAI MARA CONSERVANCIES
CULTURAL & NATURAL RESOURCE
CONSERVATION ACTION PLAN

Photo: Daniel Hernández-Salazar © 2015

Oscar Iván Maldonado (Process Facilitator and Editor),
Irene Amoke, Sean Anderson, Chania Frost, Helen Gibbons, Dickson Kaelo, Daniel Sopia, Stewart Thompson (Contributors)

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Maasai Mara Conservancies Cultural and Natural Resource Conservation Action Plan

Editor:
Oscar Iván Maldonado, Consultant (oimaldonadov@gmail.com)

With contributions from: Irene Amoke, Sean Anderson, Chania Frost, Helen Gibbons, Dickson Kaelo, Daniel Sopia and Stewart Thompson

Cartography: Irene Amoke (CNR-CAP Scope Area)
Other maps: ElephantVoices & Save The Elephants, and MMWCA

Planning Core Team:
Helen Gibbons, MMWCA
Munira Anyonge, TNC
Allan Earnshaw, MMWCA
Daniel Sopia MMWCA
Evans Mwangi PREPARED
Edwin Tambara AWF
Robert Ndetei WWF
Apollo Kariuki KWS
Dickson Kaelo KWCA
Oscar Maldonado Independent Consultant

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Wildebeest in the Greater Mara. Daniel Hernández-Salazar © 2015 /MMWCA

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d. Acronyms and abbreviations used in this plan

AWF: Africa Wildlife Foundation
CRS: Corporate Social Responsibility
CWCCC: County Wildlife Conservation and Compensation Committee
GIS: Geographical Information Systems
GME: Greater Mara Ecosystem
ILRI: International Livestock Research Institute
IPCC: Intergovernmental Panel on Climate Change
IUCN: International Union for Nature
KEA: Key Ecological Attribute
KFS: Kenya Forest Service
Kenya National Bureau of Statistics
KWCA: Kenya Wildlife Conservancies Association
KWS: Kenya Wildlife Service
KWT: Kenya Wildlife Trust
MaMaSe: Mau Mara Serengeti Sustainable Water Initiative
MEP: Mara Elephant Project
MMNR: Masai Mara National Reserve
MMWCA: Maasai Mara Wildlife Conservancies Association
MoU: Memorandum of Understanding
NEMA: National Environmental Management Authority
NGO: Non-Governmental Organisations
OOMT: Olare Orok Motorogi Trust
TBD: To Be Determined/Defined
TNC: The Nature Conservancy
UNDP: United Nations Development Programme
WWF: World Wide Fund for Nature

e. Foreword

The Maasai Mara Ecosystem—home to the greatest mammal migration in Africa and the world-renowned Maasai tribe—is the jewel of the crown for wildlife conservation and safari tourism in Kenya. Hosting more than 95 species of mammals and over 550 species of birds, the Mara contains approximately 25% of Kenya's total wildlife (Ogutu et al. 2015). The Greater Maasai Mara Ecosystem, playing host to this abundance of wildlife is composed of the state protected Maasai Mara National Reserve (MMNR) of 1,510 km^2 and adjacent community and private lands—historically totalling approximately 6,000km^2, forming the northernmost part of the Serengeti-Mara ecosystem. With three-quarters of the ecosystem outside of the state protected area, our vision—to secure wildlife and sustainable livelihoods for a better future—will be won or lost not in the MMNR but in the conservancies and the neighbouring areas—an estimated area of 3,000km^2.

The Mara's conservancy movement formally started in 2005 and at the present time, the private and community lands include nine operational conservancies at various levels of development, covering 1,150 km^2 and increasing the total protected area coverage from 26% to 43% of the entire Mara Ecosystem. These conservancies are mainly financed by the tourism sector and governed by joint stakeholder conservancy boards, composed of landowners and tourism parties. Through the payment of monthly leases by the tourism parties (and a private benefactor in one conservancy) to the Maasai landowners, the conservancies support the livelihoods of approximately 3,000 landowners, equivalent to an estimated 25,000 people (as each landowner represents a family of approximately 7.4 people). There is continued interest in establishing new conservancies across the region, with another six proposed or in formation.

Despite this progress over the past few years in restoring and protecting critical sections of the ecosystem, there are numerous existing and rising threats and challenges. In particular, the unstable tourism climate that is highly sensitive to the national security issues facing Kenya as well as other events, such as the outbreak of Ebola in western Africa. This sensitivity of the tourism sector, on which so much of the Mara conservancies' model relies, creates a serious challenge of sustainability, exacerbated by other challenges like: the absence of ecosystem management or planning; lack of a Mara-wide conservancy governance approach and benchmarks; an insufficient network of conservancies and conservation areas to protect the critical areas and intense competition between people, wildlife, livestock and tourism for the finite space and natural resources.

The Maasai Mara Wildlife Conservancies Association, as the area's Regional Association, legally recognized within the Wildlife Act 2013, has the mandate from its Mara-wide membership to source funds and implement programs that will provide the leadership and coordination across the region - to conserve the Greater Maasai Mara Ecosystem through a network of protected areas (conservancies and conservation areas), for the prosperity of all. In collaboration with The Nature Conservancy (TNC) and multiple Mara related parties and stakeholders, MMWCA has developed this Cultural and Natural Resource Conservation Action Plan (CNR-CAP), to address the sustainability and future of the Greater Maasai Mara Ecosystem (excluding the Maasai Mara National Reserve).

The aim of this Conservation Action Plan (CAP) is to create a framework across the Greater Maasai Mara Ecosystem that, on the one hand, identifies the key targets and critical objectives to be achieved over the next years in order to sustain the magnificence and integrity of the region and, on the other hand, proposes some of the core strategies to be taken forward from January 2016 to enable risks and threats to be mitigated and opportunities to be leveraged, with actual activities specified for the immediate 12 months.

It is a far reaching CAP, incorporating cultural and tourism strategies, financial sustainability for the conservancies, land use planning, the coexistence of wildlife and people, as well as sustainable grazing. It unites a breadth and depth of knowledge and research, into a Mara-wide planning framework. Additionally, it provides a multi-level approach that builds a robust and sustainable Greater Maasai Mara culture and natural resource planning framework that will guide and inform both existing and new Mara stakeholders in their development path.

In conclusion, this Conservation Action Plan has been developed through a bottom-up and top-down approach; a stakeholders' workshop in the Mara in September 2015, complementing strategic discussions and thought leadership amongst critical thinkers during the course of the year. Through

this intercourse, we believe we have identified the critical interventions and strategies, to achieve our vision for the Greater Maasai Mara: *A cultural landscape where communities and partners secure wildlife and sustainable livelihoods for a better future.*

f. Acknowledgements

The Maasai Mara Wildlife Conservancies Association wants to thank all the participants (see Appendix 2 for complete list) who attended the Conservation Action Planning (CAP) workshop in the Maasai Mara, September 2015, as well as the individual contributors who gave their time, expertise and knowledge in creating this important planning framework document.

The Mara workshop was dynamic, interesting and educational and provided an opportunity for participants to become versed in conceptual models and the open standards approach for conservation planning. All were actively involved in discussions and group exercises and their efforts are greatly appreciated.

In particular we offer a special mention to individuals who led working groups during the workshop and later spearheaded sections of this document, they are: Dr. Irene Amoke, Chania Frost, Dickson Kaelo, Sean Anderson and Prof. Stewart Thompson.

We express our gratitude to Sarova hotel for their excellent facilities and logistics and to Ken Esau for his technical support in the preparation and development of the workshop, as well as Daniel Sopia, (MMWCA's Conservancies' Council Chairman), for his leadership in organising the workshop.

Special thanks to Oscar Maldonado for his outstanding professional discipline, expertise and direction in developing this Conservation Action Plan. Thank you for keeping us focused amongst many other demands and ensuring that we developed this document, within a timely manner.

And as well, to acclaimed photographer Daniel Hernández-Salazar, who contributed his expertise in visually recording the workshop and taking a wide selection of photographs capturing the dynamics of the workshop and the diversity of the Mara ecosystem.

Finally, we are indebted to The Nature Conservancy and in particular Munira Anyonge and Charles Oluchina for the generous funding, participation and inspiration behind this Cultural Natural Resource, Conservation Action Plan and for the ongoing support they are providing to MMWCA for its development across the Greater Maasai Mara Ecosystem, Kenya.

Helen Gibbons
Chief Executive Officer
Maasai Mara Wildlife Conservancies Association

g. Executive Summary

This Cultural and Natural Resource Conservation Action Plan (CNR-CAP) responds to the need of undertaking an integrated planning process across the different conservancies neighbouring the Maasai Mara National Reserve (MMNR), in order to effectively address pervasive, increasing threats to wildlife and ecosystems across the Greater Mara Ecosystem (GME). Considering the importance that the Maasai people and their culture have had in shaping their landscape, this action plan took into account that the GRE is, above all, a cultural landscape.

The methodology that guided the planning process was the Open Standards for the Practice of Conservation (OS). Based on science, the OS focus directly on implementing actions based on measurable outcomes and working hypotheses to be tested by the implementation on the ground.

The CNR-CAP defined its geographical scope comprising a **Core Area**, which expands to all existing conservancies and surrounding areas where new conservancies or conservation areas are proposed or could be created in the near future, and an **Influence Area** that encompasses important areas for conservation, east to the Core Area. This zone is part of the Greater Mara Ecosystem and is of critical importance for long-term wildlife conservation. The following vision statement will inspire work across this scope area: *"A cultural landscape where communities and partners secure wildlife and sustainable livelihoods for a better future*."

In order to focus the conservation work, eight conservation targets were selected to represent the biological diversity and critical threats, being three of them species: **Elephant** and **Wildebeest**, both of them important playing an important role in shaping the landscape, and threatened by poaching, human wildlife conflict and diverse factors that reduce their required space; and **Lion**, apex predator, also threatened by poaching and human-wildlife conflict. Three other targets are ecosystems, which were chosen to represent the habitat heterogeneity of the savannahs of the GME: **Grasslands**, **Forests**, and **Woodlands**. The three of them are exposed to conflicting land uses, such as agriculture, human settlements and overgrazing. This plan also considers non-biological targets, being the **Maasai Culture** one of them, not only because of its intrinsic significant value, but because it is considered a critical component to achieve and sustain conservation outcomes. Lastly, **tourism** represents a fundamental aspect of conservancies, which both sustains and is sustained by wildlife conservation. It is not, however, a "conservation" target *per se*, but rather a social target resulting from the ecosystem services provided by wildlife conservation.

All these 8 conservation targets have a critical importance for the CNR-CAP as they are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. The viability analysis demonstrated the urgent need to work on them in a coordinated, integrative manner. Only two, Elephant and Lion were rated in "Good" status, whereas Wildebeest, Grasslands, Woodlands, Water Sources, the Maasai Culture and Tourism were rated "Fair." The most critically endangered target is Forest, rated "Poor."

The need for an integrative conservancies-wide approach definitely increases by the serious level of current threats to wildlife and the Maasai culture. The planning process highlighted eleven major threats. They are defined as ultimate human activities or processes negatively impacting the viability of the conservation targets. Six of them were rated "High": Fencing, Unplanned Settlements and Urbanisation, Uncontrolled/Unsustainable Grazing, Human Wildlife Conflict and Charcoal Burning and Logging, and Infrastructure; three were rated "Medium": Poaching, Agriculture Land Use, Loss of Maasai Culture, and only two were rated "Low": Sand Extraction and Pollution. Climate change is not necessarily deemed as a threat, but it is the root cause of local effects that do represent threats to wildlife and ecosystems. This plan considers that more research needs to be undertaken in order to clearly define what climate change effects need to be addressed and design proper mitigation or adaptation strategies accordingly. Climate Change has been included in the list of top research priorities of this plan, so that immediate actions can be implemented.

For addressing threats and ensuring the long term viability of the targets, four conservation strategies were designed: Land Use Planning for a Long-Term Functional Ecosystem; Sustainable Grazing and Beef Production; Preserving the Maasai Culture; Harmonious Coexistence of People and Nature. The land use planning strategy aims to expand lands suitable for conservation and sustainable land management, minimising incompatible land uses and unsustainable practices, reducing the rate and

extent of fencing, as well as to allow degraded areas to be restored, increasing land resilience and connectivity across the landscape. The sustainable grazing strategy seeks to increase the resilience of the Mara's rangelands, the value, productivity and income generated by livestock, while reducing livestock stock rates, unsustainable land uses, and impacts on wildlife. The strategy regarding the Maasai Culture pursues preserving the positive cultural pillars, particularly its harmonic relation with wildlife and environment. Finally, the fourth strategy includes different intervention fronts to maintain stable wildlife populations and distribution across the Greater Maasai Mara ecosystem, and to reduce the human footprint on the environment and wildlife, creating a harmonious co-existence of people and nature. None of these strategies would prosper if funding is not properly considered. For that reason, a fifth strategy was designed to ensure long-term financial stability for the conservancies.

1. Introduction

It has been my lifelong dream to see the wildlife of East Africa. Yet now that I am here, though I find the wildlife impressive, it is the Maasai people and their culture and way of life that moves me even more.
U.S. Rancher Bill Miller
(cited in Curtin & Western 2008)

This action plan responds to the need of undertaking an integrated planning process across the different conservancies neighbouring the Maasai Mara National Reserve (MMNR), in order to more effectively address pervasive, increasing threats to wildlife and ecosystems currently occurring in the Greater Mara Ecosystem. Such a need was reported by an assessment carried out in January 2015 (Maldonado 2015), which identified that different planning initiatives across the Maasai Mara landscape had little level of interaction and mutual reinforcement and, for that reason, vital opportunities for collaborative work were missed, to the detriment of better and more enduring conservation results on the ground.

The Maasai Mara, along with the neighbouring Serengeti, represents the most iconic landscape of Africa in the World. This fame is not only due to its wildlife, the mega-fauna, and the particular beauty of the savannahs, but also because it is a long-inhabited landscape where the people, the Maasai, have traditionally played an important role in shaping the ecosystem for at least three thousand years (Reid, 2012). Indeed, the greater Maasai Mara ecosystem is not any different to other grassland ecosystems in the world: it is mostly a cultural landscape where wildlife and humans have coexisted for centuries. Moreover, some scholars may argue that the Maasai grassland ecosystem exists because, and not despite the interrelations between the Maasai people, wildlife and their environment (the Maasai cultural practices, the non-biotic resources and ecological processes, and the landscape).

This Cultural and Natural Resource Conservation Action Plan (CNR-CAP) is thus made with the consideration that a thriving Maasai Culture is as important for the Greater Mara Ecosystem (GME) as wildlife is, so it is necessary to initiate prompt actions to conserve both and the mutually reinforcing relationship that links the two.

1.1. Rationale

Conservancies across the Mara landscape were established both organically and independently, although they face few distinct individual issues. More than in many other large conservation areas, critical threats and constraints are shared across the Maasai Mara, not only among well-established conservancies, but also in the rest of neighbouring critical areas that do not have any conservation management regime yet. All these areas constitute the same landscape, which can be defined not only by its ecological and cultural features, but also by being exposed to the same pressures and opportunities.

As a matter of fact, the main rationale for the establishment of conservancies is that the Masai Mara Natural Reserve—one of the most important and famous protected areas in the world, is insufficient to guarantee the long term viability of its well-known emblematic species, like elephants and wildebeest, and the integrity of the whole ecosystem that depends on the great migration. Consequently, the future of the National Reserve depends on the success of the conservancies, and the success of each individual conservancy depends on the success of the whole conservancy-system. For that reason two very basic premises should govern the conservation approach across this landscape:

- A single conservancy is not enough to ensure long term wildlife conservation
- All and each conservancy is only one part (a significant part, though) of the whole ecosystem

In turn, these premises provide the rationale for a conservancies-wide common agenda that considers that:

- The ecosystem encompasses (and depends) on wide-range, highly migratory species that require a larger landscape approach;
- The conservancies have particular threats and constraints, but most of them (if not the all of

them) are shared across the conservancies system: land sub-division and fencing; poaching; land-conversion, among others;
- Most of current critical threats are systemic, thus they require a broader and more integrated approach in addition (if not instead) to a site-based response;
- Some needed actions (anti-poaching, monitoring) can be expensive and require integrated action to identify their outcomes over the larger system taking advantage of economies of scale.

The need for an integrative conservancies-wide approach definitely increases by the critical level of current threats to wildlife and the Maasai Culture. New policies have radically modified the land management, encouraging fencing and thus interrupting the natural movement of species through their migration routes. Current and potential land use is at risk of becoming a major threat with catastrophic impacts on all natural resources and livelihoods. Poaching, in particular elephant poaching, is intensifying fast as well, but is a dynamic threat that moves across the landscape in occurrence and intensity. Its response is costly and risky, and requires not only coordinated action, but also sustained sources of funding to be successful.

On the other hand, engaging in an integrative planning process also provides the opportunity to redefine the conservation paradigm, understanding the intertwining relationship between the Maasai culture, their livelihoods, and the Mara ecosystem, in particular the wildlife. It is clear that none of these parts can prevail without the other—a characteristic that truly makes the Maasai Mara, above all, a cultural landscape.

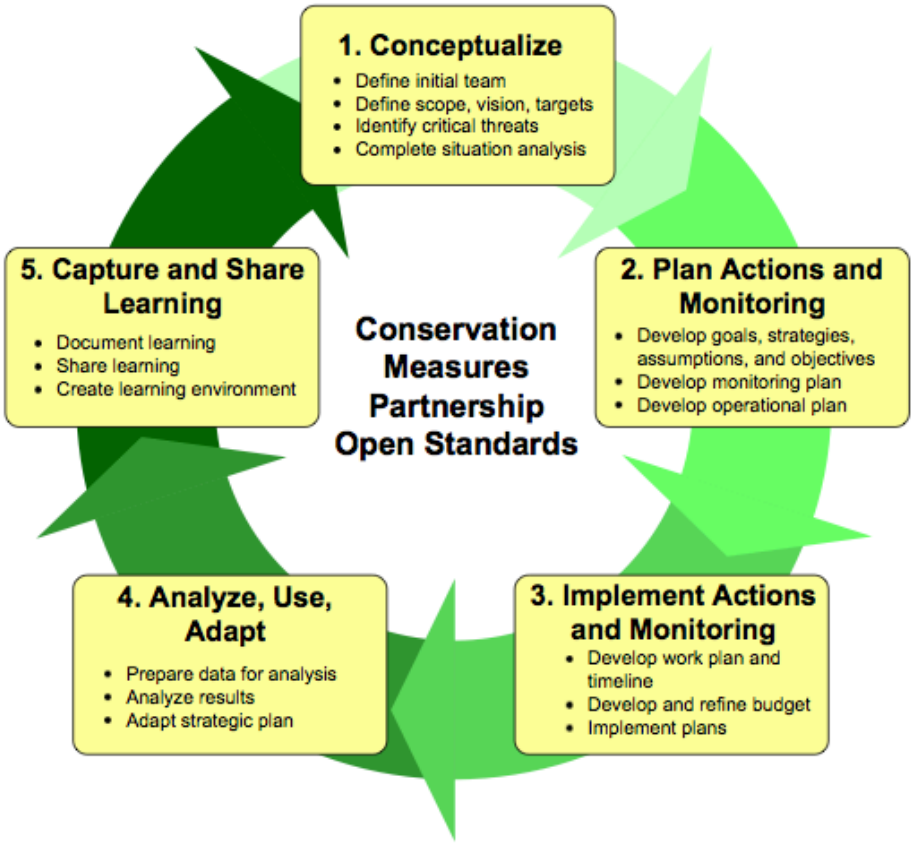
1.2. Methodology

The Open Standards for the Practice of Conservation (simply know as the Open Standards—OS) was the methodology used for developing the CNR-CAP. Several reasons justified this choice:

1. The OS are the planning methodology for a number of conservation organisations working either across the Mara e.g., WWF, or supporting conservation initiatives in the Mara e.g., African Wildlife Foundation, The Nature Conservancy. It is therefore largely a common, shared and known methodology.
2. The OS are inspiring the new official conservation planning guidelines of the Kenya Wildlife Service (A. Kariuki, comm. pers.). Further, applying OS for the Mara could have a didactic purpose given that other planning efforts will include a similar approach in the future—including the forthcoming requested plans, such as the Narok County Spatial Plan, the Greater Mara Ecosystem Plan and the conservancy-level plans.
3. Science-based, the OS focus directly on implementing actions based on measurable outcomes and working hypotheses to be tested by the implementation on the ground. Many conservation plans in the Mara have lacked immediate action plans, causing a frustrated implementation. The OS seeks to overcome this limitation.
4. The OS level of complexity for planning (not the level of rigour) can vary according to the urgency of getting to the implementation stage. A “Rapid OS” variant has been broadly used in cases that require urgent actions, or/and that cannot compromise or invest too much stakeholders’ time in the planning process.
5. The OS are also based on the principle of encouraging participation of major critical stakeholders. Their viewpoints and opinions are the major component for the situation analyses that leads to the strategy development.
6. Over the years of practice, OS has succeeded in incorporating not only a biodiversity focus, but also a cultural approach, analysing the interaction between both natural and cultural conservation targets. Given the characteristics of the Maasai Mara, such an approach is appropriate. From such a process, a ***Cultural and Natural Resource Conservation Action Plan*** (CNR-CAP) focused on specific targets (both natural and cultural) could emerge.

The Conservation Measures Partnership (CMP), an alliance to which most of the international conservation organizations belong, created the Open Standards. They assemble proven best practices for conservation project planning and management in their different phases and steps. Indeed, more than just planning, the OS focus on sound project management, where monitoring, learning, adapting

and sharing are key components of the project cycle. Or put differently, major phases of OS focus on planning to proceed to action and undertake adaptive management, as shown in the diagram below.



Graph 1: Open Standards Project Cycle (Source: CMP 2007)

1.3. The planning process

The initial assessment developed in January 2015 identified some challenges in undertaking the integrative planning approach that this process wanted to avoid. For this reason, the planning process needed to be designed not only to bring together all critical stakeholders and on the same page, but as well, doing it in a rapid and efficient manner so that planning fatigue—an undesired effect that had hindered previous efforts and could jeopardize effective participation and results, was side-stepped. Further, the process was also designed for reconciling a science-based approach with different parties' interests, and for focusing on immediate implementation.

With this in mind, the plan's process incorporates three phases:

a. First Phase: Planning

- Methodological and logistical preparation, comprising selection of basic information and participants for the preparation of the planning workshop agenda, materials and logistics
- The planning workshop, on-site, with the participation of more than 40 attendants, conducted from 7th – 11th September 2015.
- Analysis, writing, editing and review of this CNR-CAP document from September to end of November 2015

b. Second Phase:

- Implementation of the immediate activities that require urgent implementation
- Implementation and development of activities that can launch or sustain other activities or strategies over the medium- and long-term
- End of year review and assessment of progress to date

c. Third Phase:

- Based on annual review, follow up on implementation of on-going strategies and activities
- Based on the plan's priorities and proposed zoning, influence on other planning processes at lower (conservancies and other conservation areas within the CNR-CAP scope area) and upper (the wider County Area) levels.

1.4. The Scope of the Plan

The action plan's scope is the area where the biodiversity or cultural features of interest are located and where positive changes resulting from our strategies are expected. Most of the strategies are expected to take place within the geographical scope of this plan, but this does not preclude implementing other required interventions outside of the defined area—particularly the ones that focus on policy, fund-raising and building conservation partnerships and support.

For the CNR-CAP, the scope comprises two areas, Core Area and Influence Area, as follows:

Core Area:

The Core Area comprises all existing conservancies and surrounding areas where new conservancies or conservation areas are proposed or could be created in the near future. The strategies included in this plan are to be carried out in this area.

More specifically, the Core Area is determined as follows and as shown below in Map 1:

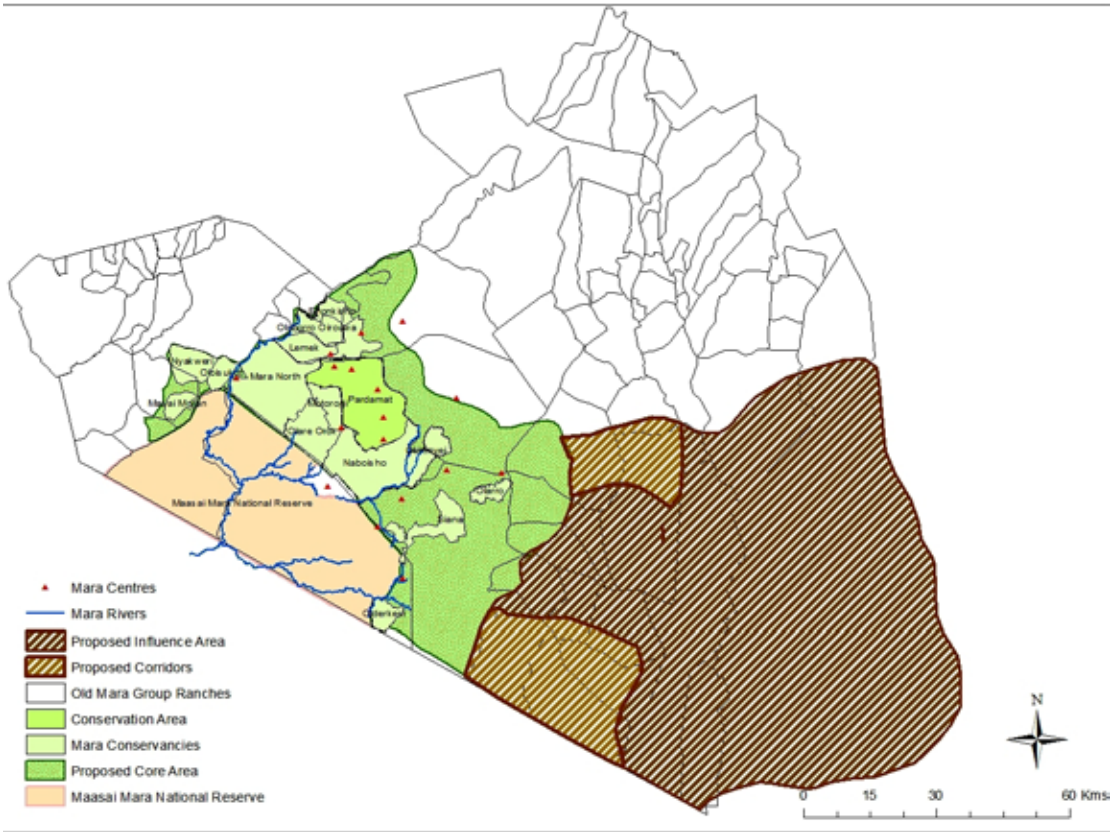
- West of the Isiria escarpment onto the Euclea bushland on Oloirien group ranch including the proposed Maasai Moran Conservancy and covering the entire extent of Nyakweri forest and Oloisukut Conservancy, buffering Oloisukut Conservancy down to the Mara River.
- Following North the Mara River all the way to Emarti Bridge and all the areas within Enonkishu Conservancy; then eastwards along Emorijoi Hills to Njsuani bellow Lemek centre.
- Extending East of the Pardamat hills, to the cultivated land and fenced land of Olkinyei, crossing the Narok-Sekenani road, near Lekanga hills extending to the Majimoto and Parkitabo hills.
- Extending southwards to the western tip of Naikara, including proposed Olpua Conservancy; further extending along the Olderkesi Conservancy border, to the Kenya-Tanzania international border.

Influence (or Secondary) Area:

The Influence Area (also called Secondary Area) encompasses important areas for conservation, east to the Core Area. This zone is part of the Greater Mara Ecosystem and is of critical importance for long-term wildlife conservation. Although no direct activities are currently planned, the CNR-CAP is expected to have an influence there amid relevant stakeholders e.g. through the Greater Mara Ecosystem Plan, in order to amplify the geographical scope of conservation endeavours.

This area includes (as shown below in Map 1):

- The area adjacent to the Magadi-Loita ecoregion including the Naimina Enkiyio forest, the plains West of the forest and the Ngurman escarpment to the Shompole and Olkiramatian and extending north-east to the Mosiro Suswa region under the coordination of the Southern Association of Landowners (Soralo)
- The Majimoto-Narosura plains and the Pololet-Morijo plains.



Map 1: CNR-CAP Geographical Scope

1.5. Vision for the Plan's Scope

The vision is a statement that summarises the desired, ideal state or ultimate condition that the stakeholders involved in the implementation of the plan would like to achieve. The value of the vision resides both in representing a general agreement on which the conservation actions are founded, and in being a source of inspiration and commitment.

As the Mara is a multi-lingual landscape, three versions of the vision statement for the CNR-CAP Scope area were developed, in English, Maasai, and Swahili.

Vision Statement

"A cultural landscape where communities and partners secure wildlife and sustainable livelihoods for a better future"

Maa Version of the Vision Statement

"Orbakunei lolkuaak naibungate ilopeny olaretok pee eramati inguesi peetumi dupoto nabikoo oonkolongi naaponu"[1]

Swahili Version of the Vision Statement

"*Kwa Mazingira yautamaduni na maliasili ambapo jamii na washirika wanamaisha endelevu kwa kuulinda na kuhifadhi wanyamapori kwa maisha bora yabaadaye*"[2]

[1] Free translation from English by Daniel Sopia

[2] Free translation from English by Ken Essau, reviewed by Irene Amoke

2. Conservation Targets

According to the OS and other related methodologies (e.g. TNC's Conservation Action Planning, or WWF's Project and Program Management Standards), Conservation Targets are a limited set of species, communities and ecological systems that represent and encompass the full array of biological diversity found in the plan's geographical scope area.

The reason for focusing on selected conservation targets is strategic and managerial. It rests on the assumption that there is no project that can comprehend the full biological diversity (of which many components are unknown), so there is a need to specifically select the most emblematic features—ecosystems or wildlife species, as reference points to the others, that represent the major threats that critically affect some or all of the features.

From this approach, three "fine filter" conservation targets were selected[3]: **Elephant** and **Wildebeest**, both of them important shapers of the landscape, which are threatened by poaching, human wildlife conflict and diverse factors that reduce their required space; and **Lion**, as the apex predator, also threatened by poaching and human-wildlife conflict.

Similarly, three "coarse filter" conservation ecosystem targets (ecosystems) were chosen as they represent the habitat heterogeneity of the savannahs of the Greater Mara Ecosystem: **grasslands**, **forests**, and **woodlands**. The three of them are exposed to conflicting land uses, such as agriculture, human settlements and overgrazing.

For some conservation initiatives, such is the case of the CNR-CAP, it is also important to consider non-biological conservation targets. As the acronym of this plan stands for, the cultural component is of particular importance for the GME. Indeed, the **Maasai Culture** is not only considered as a conservation target, but also as a necessary component to achieve the biological-targets, and long-term endurance of the positive results.

Lastly, **tourism** represents a fundamental aspect of conservancies, which both sustains and is sustained by wildlife conservation. It is not, however, a "conservation" target *per se*, but rather a social target resulting from the ecosystem services provided by wildlife conservation, namely the educational, recreational, inspirational and aesthetic values.

All these 8 conservation targets have a critical importance for the CNR-CAP as they represent the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness.

2.1. Conservation Target Description

2.1.1. Elephant (*Loxodonta africana)*

The African elephant is currently found in 37 countries in sub-Saharan Africa (Blanc *et al., 2*007) with individual home ranges varying from 15 to 3,700km^2 (Douglas-Hamilton, 1972). They tend to move between a variety of habitats and over wide altitudinal and latitudinal ranges, from dense forest, open and closed savannah, grassland, arid deserts, mountain slopes and oceanic beaches, and from the northern tropics to the southern temperate zone. Despite large tracts of continuous elephant range remaining in parts of Central, Eastern and Southern Africa, elephant distribution is becoming increasingly fragmented across the continent (Blanc, 2008). The African Elephant is subject to various degrees of legal protection in all range states. Although up to 70% of the species range is believed to lie in unprotected land, most large populations occur within protected areas. An increasing number of trans-boundary elephant populations are co-managed through the collaboration of relevant neighbouring range states.

[3] TNC's versión of OS, Conservation Ation Planning, suggest the coarse filter/fine filter approach for selecting conservation targets. Coarse filter targets are defined by ecological systems that, when conserved, also conserve the species they encompass. The fine filter targets are species and/or communities that are not well captured by coarse filter targets because they face particular threats and therefore require specific attention.

The African elephant is the largest living land mammal with males of the species weighing up to 6,000kg (Hanks, 1969). Their diet may include grass, herbs, bark, fruit and tree foliage. In savannah habitats, grass may make up 70% of the elephants' diet in the wet season, with larger proportions of browse contributing to their diet as the dry season progresses. Estimates for mean daily intake range from 4% (Laws et al., 1970) to 7% (Ruggiero, 1992) of body weight, whilst they only digest 40% of what they consume. Elephants are capable of greatly affecting the structure of vegetation and at high densities reduce woodlands, converting them to more open grassland (Western, 1989). Vegetation damage caused by elephants is a normal activity and can contribute to beneficial changes in habitat diversity and biomass turnover (Poole et al., 2013).

Elephants are noted for their intelligence, close family ties and social complexity (Moss, 1988), as well as their ability to communicate over long distances through the use of powerful low frequency calls (Poole et al., 2013).

The species is known to have become nationally extinct in Burundi in the 1970s, in The Gambia in 1913 and in Mauritania in the 1980s. Eastern Africa was the region with the largest number of elephants in the 1970s, but also the one that experienced the worst poaching episodes in that and the following decade. The African Elephant was listed as Vulnerable (VU A2a) in the 2004 IUCN Red List, prior to which the species was listed as Endangered (EN A1b) (Blanc, 2007).

Description of target in project scope

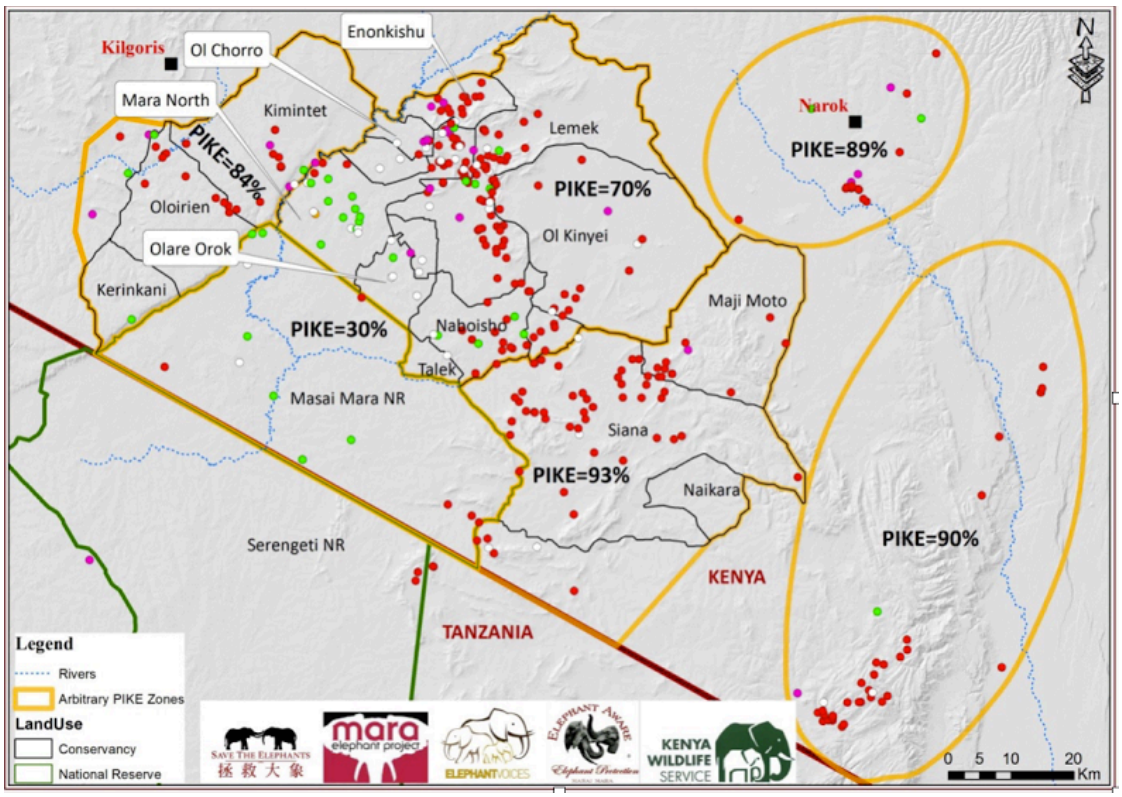
Giving an accurate figure for the number of elephants present in the Greater Maasai Mara ecosystem is problematic as the elephants move significant distances throughout their extensive home range, which in this case includes movement across the Kenya-Tanzania border. It is possible to either give a figure for the number of individual elephants that use the Mara, or alternatively the number of elephants that are occupying the Mara at a particular point in time (Poole et al, 2015).

Considering historical counts since 1986, it was estimated in 2013 that 4,132 elephants were using the Mara side of the Serengeti-Mara ecosystem (Poole et al., 2014). Populations are not evenly distributed, with relatively higher densities found in the southern Mara and most (60.5%) found within MMNR (Aerial Count 2014).

In the Mara ecosystem, groups may vary in size from one to over 300 individuals. These different group types and sizes are not randomly dispersed in the ecosystem, as human activity, together with associated threats, strongly influence the location and distribution of elephants, their behaviour, patterns of movement and tendency to aggregate (Poole et. al., 2015). For example, high pressure from livestock tends to increase competition for grazing and reduce elephant group size, as in the northern parts of the Mara ecosystem (Poole et al., 2015). Elephants have also been recorded as being sensitive to changing levels and patterns of security. This includes illegal killing of elephants, which influences their population dynamics and movement, such as taking refuge in more secure areas and seeking safety in numbers, applying more and extended pressure to the ecosystems in these 'safe-havens'. In this case, the current impact of elephants in the MMNR is a product of unsustainable levels of livestock grazing and insecurity in the greater ecosystem (Poole et. al., 2015). "Unless livestock and other anthropogenic activities are carefully managed conflict with elephants is likely to increase" (Poole et. al., 2015).

Various stakeholders, including conservancies and community members, have participated in monitoring of elephant mortality since 2010, with an aim to better understand the interactions and dynamics between people and elephants, as well as elephants and their habitats. The Mara research partners adopted the MIKE (Monitoring of Illegally Killed Elephants) protocol (Poole et. al., 2015) and data collected from the Mara ecosystem between 2010 and 2014 shows that incidences of illegal killing occurred predominantly outside the MMNR with comparatively higher PIKE (Proportion of Illegally Killed Elephants) values than inside the Reserve, where only 30% of elephant mortalities were attributed to illegal killing (Map 2). In some areas the PIKE is extremely high (e.g. Siana Conservancy recorded a PIKE of 93%) and are among the highest levels of illegal elephant killing recorded in Kenya. The area covered by established Mara conservancies had the lowest PIKE figures of any area outside of the MMNR, at 70%. "An elephant population is deemed to be in decline when a PIKE of 54% and above is recorded" (Poole et. al., 2015). Whether inside or outside of the Reserve, in the case of injury (physical wounds or death), the KWS veterinarians immediately provide treatment and, whenever

necessary, tusks are removed from a carcass (Obanda et. al., 2008). However, the need to strengthen management strategies especially outside the MMNR where PIKE figures are far higher than the sustainable limit is pertinent.



Map 2: Elephant mortality by causes and distribution of carcasses in the Mara ecosystem from 2010 to 2014. An arbitrary zoning (bold orange polygons) of the Mara ecosystem has been done for purposes of comparing average PIKE values between areas. The PIKE values were above 54% except for Maasai Mara NR indicative of a population in decline from illegal killing. (ElephantVoices & Save The Elephants, in Poole et al., 2015)

Rationale as a conservation target

As a keystone species, elephants play a crucial ecological role, maintaining linkages in the food web, acting as agents of seed dispersal (Alexandre 1977), increasing habitat mosaic in forests (Kortlandt 1984) and diversifying mammalian communities (Western 1989). Their extermination from some habitats may cause a cascade of change or extinctions in ecosystems (Western 1989). Additionally, elephant tourism in Kenya alone is worth an estimated US$200 million annually, with each elephant being worth US$14,375 per year and almost US$900,000 over a lifetime (DiSilvestro, 1991). Due to the high profile of the elephant species and the international poaching crisis, protection authorities are mandated to pursue and follow up on elephant poaching incidents, translating to increased security for all other wildlife in the ecosystem, as well as for tourism (T. Caro, pers. obs.). As elephants are under tremendous poaching and conflict pressure (Douglas-Hamilton, 2009; Ferreira & Okita-Ouma, 2012), whilst being both environmentally and economically important, we have a moral responsibility to protect them.

2.1.2. African lion (*Panthera leo*)

The African lion is the largest of all African carnivores. The main period of growth is in the first three years with males attaining maximum weight at 7 years old (190kg) and females at 5 to 6 years old (126kg) (Skinner & Smithers, 1990). Unlike other felids, lions are social beings and live in fission-fusion groups, the foundation of which is a group of related females and their offspring (Packer et al., 1990). Mean pride size varies and appears to be positively correlated with abundance of prey during the period of least abundance (Bygott et al. 1979). Lion densities are directly related to prey biomass (Hayward et al. 2007), and a single lion pride may require a range of up to 1,000km^2 over the course of one year (Funston, 2011). Dispersal in lions is sex-biased as sub-adult males always disperse, while females rarely do (Pusey & Parker, 1987). The age of dispersal is highly variable (20-42 months), while

the timing of dispersal is highly correlated to pride take-overs (Elliot et al. 2014). At around 4 to 6 years old, male coalitions start to challenge for pride tenure, with their reproductive success depending on the outcome. If incoming males defeat the residents, they will kill all cubs so as to bring the females into oestrus (VanderWall et al., 2009) and chase away all sub-adult males and females that are too young to breed (Hanby & Bygott, 1987, Elliot et al., 2014). Males will typically hold tenure of female prides for no more than two years before incoming males displace them (Bygott et al. 1979). Two years is also the interbirth interval for females, should their cubs survive (Packer et al., 1988). Prides defend their territories and are able to identify the numbers and identities of other lions by their roars, thereby facilitating territorial boundaries (Packer et al., 1990).

Their diet usually consists of the most locally abundant medium to large ungulates such as buffalo, zebra and wildebeest (Mills & Shenk, 1992) and preferentially preys upon species within a weight range of 190–550 kg (Hayward & Kerley, 2005).

Lions once occurred widely in Europe, the Middle East, Asia and Africa. Today they are extinct in Europe and the Middle East with the last individuals exterminated in Greece about 100 AD and in Palestine in the 12th Century (Skinner & Smithers, 1990). There is one small population of the subspecies *P. leo persica* remaining in the Gir Forest, India. On the African continent they are now extinct in the north, disappearing from Tunisia and Algeria in about 1891 and from Morocco in 1920. In the rest of Africa their range has shrunk with the encroachment of humans and they primarily occur in National Parks and Game Reserves. The current extent of free-ranging lion is around 3.4 million km^2, which represents a 75% range reduction in the last 100 years (Riggio et al., 2012)

The African lion population has almost halved in the last 3 decades and continues to decline. In 1980 there were an estimated 75,000 lions (Ferreras & Cousins, 1996), while today it is likely that there is a maximum of 35,000 free ranging lions (Riggio et al., 2012). East Africa represents a crucial region for the lions' persistence as it currently holds around 57% of Africa's remaining lions (Riggio et al., 2012). However, the prey base of lions is also in decline, having a knock on effect on this apex predator.

Description of target in project scope

Estimations of animal densities and abundance are central to effective management and conservation (May, 1999). However, obtaining accurate estimates is notoriously difficult for rare and cryptic carnivores (Ogutu et al., 2006). In 1992, 22 lion prides were documented in the MMNR and the immediate surroundings, with 484 lions including cubs, averaging 22 lions per pride, plus 74 nomads (78% of whom were males), giving a total of 558 lions at a density of 0.30/km^2 (Ogutu & Dublin, 2002). Lion density in the Mara reserve at this time ranked among the highest recorded in African savannahs (Ogutu & Dublin, 2002).

From 1982 to 1988, individual lions were found in 7 prides inside and 6 prides outside the Mara reserve. Over these 7 years, the population remained stable inside but decreased dramatically outside the reserve in pastoral lands where Maasai pastoralists had established permanent settlements by 1982–83 (Ogutu et al, 2005).

In the 2002 Mara Count, it was reported that lions have a strong preference for protected savannah (Reid et al, 2003). In Ogutu's 2002 count, there was no change in the number of lions found inside the Reserve compared with 1991, but it was suspected that lion populations have declined over time outside the Reserve, supporting trends across the continent (Bauer & Van Der Merwe, 2004) and signals a serious threat to their long-term population viability (Ogutu et al., 2005). This decline is probably owing to conflicts with pastoralism, necessitating urgent conservation interventions that integrate pastoral economic welfare with large carnivore conservation goals to foster long-term viability of lion populations in the pastoral systems (Ogutu et al., 2005). The most recent published estimate of lions in the Mara ecosystem is 286 individuals (Bauer et al, 2015) – 51% of the 1992 estimate. However, that figure actually comes from a 2005 whole count survey that was carried out over a whole year. It should be noted that the survey methods used varied, notably the figures presented by Ogutu were estimated using call-in surveys, while the figures presented by Bauer et al. (2015) were obtained from a whole count. Both methods have associated errors and inaccuracies and it is therefore difficult to draw inferences from them. More recently, the Mara Lion Project has started to intensively monitor the lion population. They have developed a spatially explicit mark-recapture methodology that will allow for accurate and biologically meaningful trends to be revealed.

Their initial survey has shown a lion density of 15.15 lions per 100 km^2, over their study area, which encompasses the Maasai Mara National Reserve, Olare Motorogi, Naboisho, Lemek, Ol Choro, Mara North and Ol Kinyei conservancies (Elliot & Gopalaswamy, in prep.).

Rationale as a conservation target

In Africa, wildlife-viewing preferences of tourists of all nationalities, budgets and experience, are narrow and exacerbated by the perceived importance of the so-called 'big five', the most popular species (Lindsey et al, 2007). With one of the highest remaining lion densities in the world, 200,000 to 300,000 tourists flock to the Maasai Mara annually to see this emblematic species. The fascination that lions exert on the general public is exemplified by economic estimates of their value for the tourism industry: in the 1980s, a single lion *Panthera leo* L. in Amboseli National Park, Kenya, was valued at US$ 128,750 per year (cited in Sergio et al., 2006). Since tourism and the benefits it brings are frequently lauded as the only reason for communities to conserve wildlife, reductions in lion populations and therefore tourism could have also a negative effect on the ecosystem more widely. In terms of ecological importance, these apex predators are necessary for ecosystem integrity and stability and, as indicator species, declines in their numbers can be symptomatic of wider problems that need to be addressed. By ensuring lions are conserved, the wider ecosystem and community stands to benefit.

2.1.3. Wildebeest (*Connochaetes taurinus*)

Formerly wildebeest distribution spanned from southern Kenya southwards to northern and eastern Namibia, Botswana, the Orange River in South Africa, and Mozambique (East, 1999; Estes, 2013), with introductions to regions outside their former distribution range, such as the Eastern Highlands of Zimbabwe (East, 1999). Population densities estimated by aerial surveys range from less than 0.15/km² in central and southern Kalahari to as high as 34.0-35.0/km² in the Serengeti and Ngorongoro Crater (IUCN, 2008). Some wildebeest populations are naturally relatively sedentary and/or their seasonal movements are generally accommodated within protected areas.

Five subspecies of wildebeest are recognized: Western White-bearded Wildebeest (*C. t. mearnsi*); Eastern White-bearded Wildebeest (*C. t. albojubatus*); Nyassa Wildebeest (*C. t. johnstoni*); Cookson's Wildebeest (*C. t. cooksoni*); and Blue Wildebeest (*C. t. taurinus*).

Wildebeest are pure grazers, showing a preference for the short-grass plains bordering Acacia savannah, open bushland and woodland in drier areas (IUCN, 2008). Serengeti wildebeest thrive on short grasslands in alkaline and volcanic soils during the rainy season, and withdraw to longer grasslands in areas of higher rainfall and permanent water during the dry season. They are rarely found above 1,800-2,100 m (e.g., the Ngorongoro Crater). Common Wildebeest require water at least every day or two in the dry season (Estes, 2013).

The most recent estimate of the total population of Common Wildebeest is around 1.55 million across its full range, largely due to the recovering of the Serengeti-Mara population to about 1.3 million (having dropped below one million following the severe 1993 drought) (Hopcraft et al., 2013). However, some subspecies' populations are in steep decline, such as the wildebeest population that migrates annually between the Maasai Mara National Reserve and the Loita Plains, which has shrunk by more than two-thirds from 1977 to 2009 due to the expansion of agriculture (Bedelian, 2013; Ogutu et al., 2011).

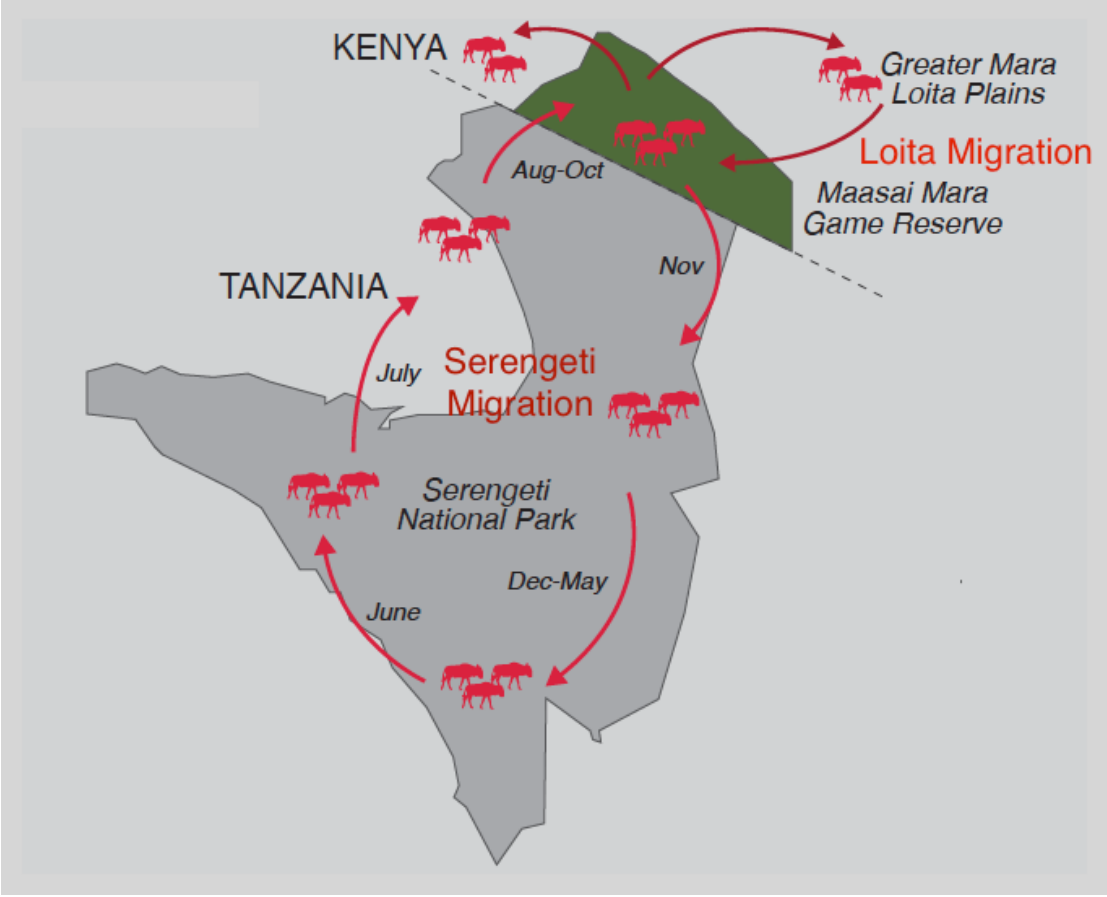
Description of target in project scope

The Mara wildebeest population comprises both migratory and resident populations of the Western White-bearded Wildebeest subspecies (*C. t. mearnsi).* The East African savannahs are highly variable ecosystems, so migration enables wildebeest to track spatially and temporally varying resources across the landscape. Wildebeest migrate into and occupy the MMNR and surrounding conservancies from the Serengeti and Loita plains to access dry season grazing between July and October (Ogutu et al., 2011). They also migrate to access breeding grounds, to reduce the risks of predation and disease, and to enhance their genetic health (Bolger et al., 2008). This gives migratory wildebeest populations an advantage over resident populations, allowing these populations to rise to very high abundances (Bedelian, 2013;Hopcraft et al., 2013).

The Serengeti-Mara wildebeest population of wildebeest increased 6 fold between 1963 and 1977

following the eradication of rinderpest, before stabilizing at its current population of approximately 1.3 million (Hopcraft et al., 2013). The mammal migration is the world's largest and most species diverse, comprising 1.3 million wildebeest, 0.6 million zebras and Thomson's gazelle (Hopcraft et al., 2013) covering a distance of 1,500 kilometres every year. Whilst the Serengeti-Mara population has remained largely stable since 1977, precipitous declines of a the Loita population, resident in the Mara ecosystem, of 70%, from approximately 113,000 in 1977 to 35,000 by 2009 have occurred and this population continues to decline to date (Ogutu et al., 2011). These population declines have been directly attributed to the pervasive expansion of mechanized agriculture, increasing human population densities and livestock incursions in protected areas that have occurred across the region, as well as land subdivision, settlements, fencing, roads and other infrastructure (Bedelain, 2013). These processes fragment the landscape and obstruct migratory routes and therefore access to dry season grazing and water on which the populations are critically dependent (Ogutu et al., 2011). Climate change will exacerbate this threat as the increased frequency and severity of droughts and floods that is expected to occur (IPCC, 2012) will modify vegetation growth and hence food availability for the migrating animals. The ability of migrants to respond to changing climatic conditions is likely to be impaired by such man-made threats as habitat loss and fragmentation (Ogutu et al., 2011).

The home range size of wildebeest in the Mara ranges from 8.5 km^2 to 13,277.6 km^2, and they move throughout each of the conservancies, (except for the Enonkishu conservancy), spending most of the year in these areas, outside of the MMNR boundaries. This highlights the importance of the conservancies towards the long-term sustainability of this migratory ungulate (Stabach & Boon, 2014).



Map 3: Serengeti and Loita Wildebeest Migrations. Source: MMWCA (2015)

Rationale as a conservation target

The iconic wildebeest migrations of East Africa play a vital role in ecosystem function due to their direct effect on predator populations and grass food resources required by other wildlife species (Sinclair et al., 2008). Economically, the magnificent annual migration makes the MMNR and surrounding areas one of the premier tourist attractions in Kenya (Ogutu et al., 2011). Tourism generated an estimated US$1.2 billion revenue in Kenya in 2012 (KNBS, 2013 in Bedelain, 2013). Any loss of wildlife migrations, or their habitats, will contribute to biodiversity decline and undermine some of East Africa's key tourism products, with significant impacts on national economies. Urgent efforts need to be made to protect wildebeest migratory corridors and dispersal areas, including the Mara Conservancies, to ensure these great migrations for the future (Bedelain, 2013).

The IUCN currently lists wildebeest as a species of Least Concern with a stable population (IUCN, 2013). However, this designation relates mostly to the Serengeti-Mara population (Stabach et al., 2015), whilst for other populations, such as the Loita-Mara population, widespread and precipitous declines have been recorded (Ogutu et al., 2013).

2.1.4. Grasslands, Forests and Woodlands

The vegetation of the GME is a mosaic of habitats that compose the savannah, ranging from dense forests and woodlands through to open grassland, being the later the matrix[4]. For a comprehensive overview of the vegetation of the GME see Bennett (2002).

Globally savannah habitats are found in temperate, boreal and arid environments. Many of these are types of grassland with varying degrees of tree cover and tree species composition, which have been converted to agricultural farming. A large proportion of the world's savannah grasslands are found in the dry to arid zones with 68% found in developing countries (Boval & Dixon, 2012). Savannahs are classified as a grassland ecosystem interspersed with trees sufficiently widely spaced to maintain an open canopy (Menaut, 1983). People traditionally inhabiting the arid to semi-arid grasslands are generally nomadic to semi-nomadic pastoralists who depend heavily on extended pastures to support not only their livelihood but also their cultural values (Ayantunde et al., 2011; De Fries & Rosenzweig 2010). In areas where climatic conditions and soil quality are not suitable for food crop production grasslands remain as grazing lands, not only for livestock, but also vast numbers of wild herbivores.

- **Grasslands**

Eastern Africa is renowned as a centre of genetic diversity of tropical grasses and the centre of greatest diversity of cultivated grass species (Boonman, 1993). The Poaceae form the main vegetation layer, interspersed with few annuals and perennials, and occasional trees and shrubs, mostly Acacia spp. (Bussman et al., 2006). *Themeda triandra* is one of the most widespread grass species in sub-Saharan Africa. The species is very variable and shows wide adaptation to growth in both the highland regions and the lowland savannahs. In the Mara *T. triandra* constitutes approximately 50% of the grass cover in light to moderate grazed sites, with a severe reduction in presence in areas which have heavy livestock grazing/corral presence. Other grassland species composition throughout the Mara is variable, linked to differing environmental parameters. For example and by way of contrast, Bussman et al., (2006) located a total of 155 plant species belonging to 52 families in the Sekenani Valley, with 267 species collected from the Loita Hills.

- **Forests**

Forests are defined as vegetation of continuous tree cover at least 10m tall with over-lapping canopies (Menaut 1983). 'Forest-savannah' mosaics are highly dynamic ecosystems and support high levels of species richness due to their complex structural dynamics. 'Grass and shrub savannahs' tend to be situated on the border between desert and woodland savannahs and are drier in climate as a consequence, especially to the north (Shorrocks & Bates, 2015). 'Tree and shrub' savannah describes

[4] In landscape ecology the matrix in a landscape mosaic is defined as "the background cover type in a landscape" (Turner, et al. 2001)

a continuous herbaceous layer interspersed with trees; the dominant vegetation species in any one of these areas often form a more specific classification.

- **Woodlands**

Woodlands are described as more open areas of tree cover, with trees 8-20 meters tall and canopy cover of approximately 40%. The available light reaching the ground layer allows for the establishment of a sparse shrub layer and a ground layer dominated by grasses. The grass dominated ground layer acts as fuel for fire, which is often the biggest factor affecting woodland savannah.

Rationale as a conservation targets

The three major habitats of the GME savannahs were selected as conservation targets, given that they represent the Serengeti-Mara ecosystem spatial heterogeneity, one of the most important factors in driving ecosystem processes, which results in the seasonal movements of vast numbers of wildlife (Thirgood et al., 2004). The heterogeneity hypothesis suggests that 'simple' ecosystems (homogenous habitats) are less likely to support large assemblages of biological species than 'diverse' ecosystems where habitat heterogeneity is high (Diamond 1988; Fryxell et al., 2005; Cromsigt et al., 2009). Several studies suggest that increased habitat heterogeneity in small areas will support more diverse species assemblages and provide increased resilience to temporal variations than large areas with minimal spatial variation (Fryxell, et al., 2005; Báldi, 2008). Reed et al., (2009) conducted a study examining the spatial distribution of vegetation types (habitats) in relation to rainfall and topographic relief in the Serengeti-Mara ecosystem from satellite imagery. In tandem with prior research (Sankaran et al., 2004; Urban & Keitt, 2001) topography and climate were found to be important drivers in the distribution and species composition of habitat patches in a landscape. Concurrently, results from Reed et al., (2009) indicated that in the Serengeti-Mara ecosystem, vegetation diversity and distribution is heavily influenced by annual rainfall and the hydrological condition of the soil.

2.1.5. Water

Water constitutes a critical aspect that determines not only the long-term viability of livelihoods and wildlife, but also represents a vital element for the annual migration of wildebeest during the dry season.

The Mara River is the most important source of water in the plan's geographical scope and the GME. With a length of 395 km, the Mara River is a principal perennial source that rises in the Mau Escarpment flowing down through the MMNR and crossing part of the Serengeti National Park in Tanzania before disemboguing in Lake Victoria (MMNR, 2009). The Mara River has four perennial tributaries: the Amala and Nyangore Rivers draining from the western Mau escarpment, and the Sand and Talek Rivers, which rise in the Siana and Loita Hills respectively. Overall, the Mara River Basin covers approximately 13,750 km^2, of which 65% are located in Kenya (LVBC & WWF-ESARPO, 2010)

Rationale as conservation target

The GME rivers are of critical importance in supporting people, livestock and wildlife, particularly in dry season. They hold a fundamental importance in the great migration dynamics, and the access to these water sources by resident and migratory mammals is imperious at critical times of year. As stated in the MMNR Management Plan (MMNR, 2009—not yet approved) the wildebeest migration will be unable to survive in its current magnitude, resident wildlife species will be seriously impacted, and the area's ecology could be disturbed if the main water sources are severely altered, in quantity, quality and seasonability. In 1993, for instance, a severe short-term drought caused the death of around 400,000 wildebeest.

Anecdotal evidence indicates that the rivers' flow is declining, particularly during the dry season. The changing land use patterns (settlements and agriculture), increased effluent discharges and climate variability are affecting water volumes.

2.1.6. Maasai Culture

The Maasai tribe of Kenya and Tanzania are renowned for their colourful and proud cultural heritage, centred on their traditional semi-nomadic lifestyle and strong communal social organization. The rearing of livestock in shared grazing areas has been practiced for many centuries, whilst living in semi-permanent and easily removable dwellings made from natural materials. Traditional dress,

language, music and dance are all instantly recognizable as “Maasai”, and the age-old rituals form important pillars in the identity and wellbeing of these communities.

Maasai Culture in the Greater Mara

In the Greater Mara, the Maasai communities’ semi-nomadic culture focused on livestock rearing and semi-permanent family villages constructed from natural material has maintained an open landscape where people, livestock and wildlife are free to roam. Indeed traditional beliefs towards wildlife have further enhanced a generally peaceful and mutually beneficial co-existence between people, wildlife and the land.

Whilst these positive cultural pillars have mostly endured the onslaught of outside influences, the recent development history of the Greater Mara has brought some significant threats to the Maasai culture. Rapidly expanding pockets of urbanisation are changing and fragmenting the landscape and bringing with them a wave of Western culture and influence. The population explosion and scarce resources are also pushing the community towards alternative, non-communal land uses. Fences have become the outward evidence of the shifting values away from the tradition of a shared and open pastureland. The resultant individualistic lifestyle has lead to rising inequalities and a loss of the sense of community and togetherness.

The breakdown in elder-led traditional grazing rotation schemes and planning has also increased conflict within the community and added the pressure to fence off grass banks by individual landowners.

Rationale as a Conservation Target

The Greater Mara’s wildlife, land and people have always been inter-dependent on each other. A successful model of community-based conservation is essential if the longevity of the ecosystem is to be realized. There is an extremely strong desire for the Maasai communities to maintain their positive cultural pillars for their common good and wellbeing. Interestingly, these cultural pillars do align in many cases with the strategies needed to protect wildlife in an open landscape and build a world-class ecotourism destination on the basis of the rich wildlife diversity and the famous Maasai culture.

2.1.7. World Class Tourism Destination

The high value traveller of today is seeking memorable destinations with an enriching, experiential travel experience. To be a truly world class tourism destination, there must therefore be a strong identity around the themes of exclusivity, authenticity and sustainability. The groundwork for such a destination must include high quality operational standards and a common ethos and set of ethics across operators. The destination marketing should result in a brand that instantly recognizable in the tourism market for its exceptional offering.

Maasai Mara Conservancies as a World Class Tourism Destination

Over the past few decades, Kenya’s image in the world tourism sector has been entrenched as a high volume and low value tourism destination. The Maasai Mara National Reserve, as the nation’s most popular safari area, reflects this trend with over 5,000 beds accessing the 1,500 km^2 reserve. The lack of planning and poor enforcement of limits on new construction has fuelled this mass tourism model. The result is a generally low-end, overcrowded safari that is no longer attractive to high value travellers seeking a quality experience. Competitive safari destinations in Africa, such as the Okavango Delta (Botswana) and the Serengeti (Tanzania) are therefore widely regarded as preferable options, despite the unparalleled wildlife viewing and rich Maasai culture on offer in the Maasai Mara.

The conservancies surrounding the Maasai Mara National Reserve do however have a growing reputation for a very different and high value tourist experience. This is predominantly based on the low tourist densities, controlled by number of beds per hectare, and strict code of conducts for operators regarding key elements of a guest experience, such as quality of safari vehicles and guide training. Generally higher standards of eco-friendly methodologies and tourism infrastructure also reinforce these positive elements.

The gains made in these areas are however fragmented, with the need to further align standards of tourism operations and controls across neighbouring conservancies. There is also very little

destination marketing being done at conservancy-wide level, or indeed even at an individual conservancy level, with the vast majority of the marketing being undertaken by the individual camps.

The tourism investment model in conservancies is under urgent need of re-invention. The current prevalent model features a fixed monthly fee payable by tourism partners per bed operated in the respective conservancies, with the intention of this monthly commitment covering virtually all conservancy management costs and leases. The tourism downturn in Kenya has in turn placed severe pressure on the these operations to the point where many are under threat of collapse and payments to the conservancy, and in turn landowners or managers, are frequently delayed. This lack of financial stability is threatening the future of these tourism operations and as such, the conservancies' primary funding source.

Uncontrolled or unmanaged grazing from surrounding communities within the conservancies has the potential for conflict as well as seriously affecting the guest experience. Unplanned settlements within the boundaries of the conservancies, within sight of the guest activities or blocking crucial wildlife corridors are also major threats to the quality of the destination. Both of the above can be linked to the additional threat of competing and incompatible land use within conservancies or the surrounding areas.

Rationale as a Social Target resulting from Conservation

The conservancy financial model is extremely reliant on a stable and indeed successful tourism model, as the chief economic driver for the foreseeable future. The role of tourism revenues includes the financing of conservancy leases, the management of conservancies and the provision of employment to the partner communities. Indeed the protection of the geographical scope area's biodiversity and rich cultural heritage is undeniably inter-dependent with sustaining a thriving ecotourism destination.

2.2. Conservation Target Viability Analysis

The viability analysis is used to assess the current status of "health" of our conservation targets. Many times, particularly in starting projects or first OS iterations, the results of these analyses are not as satisfactory as one would like them to be, although having a general approach on the target viability is necessary in order to define conservation goals and prioritise interventions. Moreover, viability analyses are often a good tool to also understand the research, data and information needs.

There are two approaches for the viability analysis: the simple approach, and the Key Ecological Attribute (KEA) approach. The former is mostly based on the expert knowledge and available information from the working sessions or workshops, where each target is rated according to this 4-level scale:

Very Good - Ecologically desirable status; requires little intervention for maintenance.
Good - Within acceptable range of variation; some intervention required for maintenance
Fair - Outside acceptable range of variation; requires human intervention.
Poor - Restoration increasingly difficult; may result in extirpation of target

The KEA requires more analysis. Each conservation target needs to be assigned with at least one KEA, which are defined by the needed ecological conditions that the target requires for its long-term persistence. KEA could imply **size** e.g. population size, habitat size, area; **condition** i.e. ratio between females and males, adults and juveniles; ecosystem structure, or **landscape context** i.e. connectivity of habitat, and need to have at least one indicator i.e. specimens per square kilometre, for a species density. The indicator is used to define thresholds of acceptable range of variation that define the status from Very Good to Poor.

For species and ecosystems, some KEAs were determined to provide basic notions of the current status of each target. These KEAs, however, were only used as a guide for a preliminary analysis, but were not considered definitive. Hence, the simple viability analysis for species and ecosystems was preferred for the time being. KEA definition for each one of the 7 biological targets is a top research priority, as mentioned in point 2.3, below.

For non-biological targets, such as Maasai Culture and World Class Tourism destination, the Key Attributes were determined through a thorough description of what defines a viable target.

The results of viability analysis are presented in the following tables:

Table 1.a: Results of the viability analysis for biological targets

Viability analysis for species				
Item	**Viability Mode**	**Status**	**Sources**	**Goals**
Elephant	Key attribute	Good	Expert knowledge	Maintain the status of GOOD by conserving their habitat, movement space and grass availability
Lion	Key Attribute	Good	Expert knowledge	Maintain the status of GOOD by conserving their habitat, improving connectivity within the ecosystem and conserving their prey base
Wildebeest	Key Attribute	Fair	Rough guess	Raise the status to GOOD by conserving their migration routes and calving area as well as improving grass quality and availability
Viability analysis for species				
Item	**Viability Mode**	**Status**	**Sources**	**Goals**
Forests	Simple	Poor	Rough guess	No net loss of all key habitats in terms of area the GME No net reduction in connectivity indices for all key habitats No net loss of landscape heterogeneity in the GME Maintain both the species and structural diversity represented within the woodland, forest and grassland habitats.
Grasslands	Simple	Fair	Rough guess	
Woodlands	Simple	Fair	Rough guess	
Water	Simple	Fair	Rough guess	Raise the status to GOOD by improving water quality Raise the status to GOOD by maintaining minimum flows in dry season

Table 1.b: Results of the viability analysis for cultural and social targets

Viability analysis for cultural and social targets								
Item	**Viability Mode ---- Δ Indicator**	**Status**	**Target Viability Rating**				**Source**	**Goal**
			Poor	**Fair**	**Good**	**Very Good**		
Maasai culture	Key Attribute	Fair						Raise to the status of GOOD
KA: Communal land use	Δ Percentage of unfenced land	Fair	< 75%	76 - 80 %	80 - 94 %	95 %	Not Specified	Raise to the status of GOOD
KA: Livestock keeping	Δ Percentage of households in sustainable range (50-100)	Fair	< 60%	61 - 70%	71 - 94%	> 95%	Rough Guess	Raise to the status of GOOD
KA: Language and Dressing	Δ Percentage of people speaking language/wearing dressing	Good	< 50%	51 - 60%	61 - 80%	> 80 %	Expert Knowledge	Raise to the status of GOOD
World class tourism destination	Key Attribute	Fair						Raise to the status of VERY GOOD
KA: Tourism density	Δ Bed/acre	Good	<250	250-299	300-350	>350	Expert Knowledge	Raise to the status of VERY GOOD
KA: Bed occupancy	Δ % occupied annually	Fair					Expert Knowledge	Raise to the status of VERY GOOD
KA: Ecological footprint	Δ % of facilities with Silver ESOK rating or higher	Fair	<50%	50-69%	70-89%	>90%	Expert Knowledge	Raise to the status of VERY GOOD

2.3. Research Needs

As mentioned above, viability analysis serve to identify critical data and information gaps that need to be filled by research. Clearly, **a good definition of Key Ecological attributes for each one of the biological targets** should be the number one research priority accompanying the CNR-CAP. This list could include, but not limited to:

- Elephant and wildebeest populations and densities
- Movement/migration routes for elephants and wildebeest
- Spatial distribution and densities of carnivores, particularly lions
- Prey base for carnivores
- Savannah mosaic composition and structure (as related of its 3 main components: grasslands, woodlands and forests)
- Minimum dynamic areas for woodlands and forests, considering the landscape heterogeneity
- Suitable volume of grasses to sustain wildlife and livestock
- Structure and dynamics of grasslands
- Water quality, quantity and seasonability indicators
- Climate change effects on ecosystems and key species (particularly target species)
- Animal unit carrying capacity in the geographical scope area
- Threat related indicators: e.g. percentage of plots fenced in the geographical scope area.

3. Direct threats to Conservation Targets

Direct threats are the proximate activities or processes that have caused, are causing or may cause negative impacts to the conservation target's viability (TNC, 2007). Generally speaking, direct threats are limited to human activities, such as unsustainable grazing, incompatible agriculture, roads or logging, and do not include natural disturbances unless they are altered (e.g., irregular precipitation regimes caused by global warming) or aggravated by human activities (increase of fire occurrences because of slash-and-burn agriculture).

3.1. Threat description

3.1.1. Fencing

Land sub-division and privatization in Kenya has resulted in increased fencing across the GME, with the consequent exclusion of wildlife. The unique pastoral/wildlife system that has characterised the Mara could shortly be lost unless land holdings can be managed to maintain the free movement of livestock and wildlife (Lampry & Reid 204). The implications of land subdivision and fencing to biodiversity conservation and livestock productivity are becoming an important topic in academic literature. Kimani and Pickard (1998), for instance, state that "[land] sub-division will threaten continued extensive nomadic livestock production by decreasing mobility and the carrying capacity of group ranch land, increase the potential for land degradation and crop failures, and interfere with traditional wildlife migration patterns."

Fencing and its root causes fragment the landscape and obstruct migratory routes, the access to dry season grazing areas and water on which many mammal populations are critically dependent (Ogutu et al., 2011). The greater Mara is not only integral to the annual Mara-Serengeti wildebeest migration, but also to the "internal" migration of the majority of ungulate species as they move between preferential feeding areas and water sources (e.g. zebra, topi, Thompson's and Grant's gazelles). Often cited in the literature are the negative impacts of fencing to the African elephant, a keystone species in the African savannah. Negative impacts surround restricting the range of the elephant, which in turn lead to disruption of ecosystem structure and function (Guldemond & van Aarde, 2008; Shrader, Pimm & Van Aarde 2010; Valeix et al, 2011; Asner& Levick 2012). Additionally, concerns continue to elevate surrounding the continued compression of elephant into ever-decreasing amounts of protected area (van Aarde & Jackson, 2006; Valeix et al, 2011; Young & van Aarde, 2011). Restricting the movement of ungulate species also impacts upon predators who must be able to "follow" their prey. Previous authors (Estes et al, 2011) have indicated a likely consequence of this will be an alteration to population dynamics with the possibility of trophic cascades, leading to loss of both ecosystem function and biodiversity.

Perhaps the largest, but as yet most poorly understood impact of the increased amount of fencing links to climate change and its impact upon animal movement patterns. This was raised by Woodroffe et al. (2014) who concluded that, as climate change increases then so does the importance of wildlife mobility and landscape connectivity, noting that fencing of wildlife should become an action of last resort. Until we are much more conversant with the relationship between climate change and animal movement patterns in savannah ecosystems then the precautionary principle of very limited/zero fencing should prevail.

Fencing also limits movement and access to traditional pastoralists. A number of studies (Behnke and Scooners, 1993; Ellis et al., 1993; Swallow 1994) argue that semi-nomadic and nomadic pastoralism is the best use of semi-arid areas, as [unlike sedentary livestock production] "it allows pasture to be used opportunistically, making more efficient use of environmental variations in pasture productivity which are common in semi-arid areas" (Kimani and Pickard, 1998).

3.1.2. Agriculture

Land conversion to agriculture in the Narok County (both for intensive and subsistence agriculture) has been documented since the late 1980s (Serneels and Lambin, 2001a, 2001b). Among the many factors causing land conversion to agriculture, sources particularly concur on two: accessibility to markets and land tenure (Seneels and Lambin, 2001b). Thus far, the former has been the cause for agricultural expansion at the edges of the Maasai ecosystem and in ad-hoc plots of land. If communications are to be improved, land conversion will expand as well in other areas. As seen above, agricultural expansion is among the major causes of the Loita wildebeest population decline.

Land privatisation has been a major cause for agricultural expansion, particularly for subsistence agriculture held by non-Maasai migrating to the Mara. As it occurs with livestock, small landholdings for subsistence farming are not able to sustain families over the long term (Connelly and Chaiken, 2000), creating more pressure on the natural resource base. Seno and Shaw (2002) assert that "cultivation is far less compatible with wildlife than grazing [and that] any changes toward cultivation will have significant implications for the wildlife that utilize the reserve and adjacent group ranches." At the same time Homewood et al. (2002) report that land tenure (explicitly state/communal versus private) agricultural policy and market conditions are more the cause of rapid land-cover change and decline of wildlife than human population density and growth rates and livestock population trends.

3.1.3. Poaching

Poaching, local consumption of bushmeat and the widespread use of snares are also a severe threat to wildebeest populations, accounting for approximately 70,000-129,000 deaths per year in the Mara-Serengeti ecosystem (Rentsch and Packer, 2012). As for elephants, poaching for ivory has traditionally been the major cause of the species' decline. Between 2010 and 2014, up to three quarters of annual elephant deaths were reported by MEP as animals killed illegally in the Mara (MEP 2015). The deaths have occurred particularly in Pardamat and Siana, and as mentioned in the conservation target description, there is a correlation of avoidance of poaching events and increased levels of area management.

3.1.4. Human Wildlife Conflict

A rapidly growing human population and resulting new settlements have brought lions in closer proximity with humans resulting in high rates of livestock predation and subsequent retaliatory and preventative killings of lions (Woodroffe and Frank, 2005).

Currently the most important perceived threat is the loss and fragmentation of habitat caused by on-going human population expansion and rapid land conversion. A specific manifestation of this trend is the reported increase in human-elephant conflict, which further aggravates the threat to elephant populations. Elephants are known to forage widely beyond the boundaries of protected areas and enter into cultivated crop farms. This crop-raiding behaviour is a risk factor (Chiyo et al. 2011), which frequently causes conflicts and results in elephant injury or death (Mijele et al. 2011). It is these habitat requirements that make this species particularly vulnerable to conflict (Kangwana 1993; Kiiru 1994).

3.1.5. Unplanned Settlements and Urbanisation

The explosion of scattered and unplanned peri-urban centres in the Greater Mara has been driven by demand for services by an increasing local population and those employed in tourism or indeed tourists themselves. Ribbon developments along the main roads through the geographical scope area can clearly be identified. The increase in alternative land use has additionally led to the need for certain specialized industry services to be provided in a central location. Investors and entrepreneurs from within, but significantly also from outside the local community, have responded to the demand for these services and with no rural-urban planning in place, this has led to a disorganized flurry of development in the peri-urban pockets. These rural-urban sprawls detract from the open landscape needed for wildlife and as the basis for the traditional Maasai way of life. There is also a growing Western influence emanating from these developments, mirroring the urban culture and lifestyles found in other parts of Kenya and eroding the strength of Maasai identity of the community as is easily identified by the decrease in traditional dress and language in these centres.

3.1.6. Uncontrolled/Unsustainable Grazing

There has been widespread collapse in the traditional, elder-led grazing system in the Maasai communities, predominantly caused by the sub-division of land and a drift towards an individualistic mindset. Poor quality breeds, population increase, cash sale of small stock and a lack of education on alternative investments have also meant that there is severe over-stocking in the scope area – particularly of sheep and goats. This situation has been aggravated by very little clarity on a reasonable stocking rate, which also needs to incorporate the grazing needs of the non-domestic ungulate population.

This over-stocking has developed in a manner in which the number of livestock owned by each family unit is drastically inequitable in its distribution. Cattle barons, with good access to grass and the capital required to invest, have thousands of cattle, goat and sheep whilst other families in the community own either none or few livestock units. The impact on these families with no livestock in terms of wellbeing in the Maasai culture is significant.

Currently, the total number of livestock units in the geographical scope area is causing unsustainable pressure on the available grasslands, depended upon by both wild and domestic animals. Although the Mara has shown extraordinary resilience in maintaining huge populations of domestic and migratory wild herbivores (Lamprey and Reed, 2004), the increasing overgrazing and its long-term effects could lead to the loss of native vegetation cover. Reported effects of overgrazing include a decrease of herbaceous vegetation cover in high livestock density areas (Lamprey 1984, cited in Lamprey and Reed, 2004). Other perceived negative impacts of overgrazing involve changes in vegetation structure and composition (Fynn, 2012; Treydte et al., 2013) that impairs the functional characteristics and dynamics of grasses (Kioko et al., 2012), encroachment of woody vegetation (Talbot, 1986) and increasing incidence of erosion and poor quality of soils (Kioko et al., 2012). Desta (n/d) determines that overstocking, overgrazing and poor livestock management as an important factor for land degradation in Eastern Africa. Similarly, other studies conclude that the resource partitioning between livestock and wildlife, specifically wildebeest and zebra, have a strong potential for competition between cattle and the native species (wildebeest, zebra and other ungulates), especially in periods of time when quantity or quality of grasses are scarce (Voeten and Prins 1999).

Uncontrolled grazing also leads to a disruption in the quality of ecotourism experience in the scope area, as well as bringing related security concerns related to the unmonitored movement of herders in close proximity to unfenced tourism facilities, which could potentially lead to incidents of theft.

3.1.7. Charcoal Burning and Logging

Firewood and particularly its by-product charcoal are the main source of energy in Kenya, and even in the best case, a great proportion of the population will keep relying on wood fuels for decades (Neuberger, 2015, Kalenda, n/d). The supply of firewood and production of charcoal represent an enormous and growing threat to woodlands, forests and their biodiversity, not only because they are based on local needs and demands, but also because they represent a lucrative business which do not only include those directly collecting and burning wood (Rowan, 2009). In areas like the GME, charcoal is also known to be the alternative source of livelihood, supporting people during famine and drought disasters (Kalenda, n/d).

Both, forests and mainly woodlands face eminent environmental threat from unsustainable charcoal production, a threat that will last and increase unless deliberate efforts in organizing that practice are undertaken to promote it in a sustainable manner.

Other root causes of wood extraction from woodlands and forests in the scope area include house building materials and fencing. Some specific species are specifically affected, such as the Cedar (*Juniperus Procera*, Höchst; also known as African juniper), the only juniper naturally occurring south of the Equator, which is demanded given the durability, robustness, and resistance to termites and weather of its wood (Maundu et al. 2001).

3.1.8. Loss of Maasai Culture

The traditional Maasai life style has been one of semi-nomadism or transhumance based primarily on the requirements of their livestock, and adaptation to the annual variations in the rain regime and grass availability. That way, in wet seasons the Maasai move with their livestock to the open plains, where rain has provided abundant grass and surface water. During dry seasons they occupy the more hilly or mountainous wooded areas, where dry-season grazing and permanent water (in the form of either perennial rivers or water holes) are available. Livestock, particularly cattle, form the basis of the traditional Maasai culture and economy (Talbot, 1986).

Land subdivision is radically changing the way the landscape has been traditionally managed by the semi-nomad Maasai, which represents a tremendous shift in their culture, as it is leading to the end of the traditional pastoral life (Tallis et al., 2008). As most grasslands in the world, the Maasai Mara has always been a cultural landscape where human livelihoods was completely integrated in the ecosystem dynamics. Some scholars may argue that the Maasai grassland ecosystem exists because, and not despite the interrelations between the Maasai people, wildlife and their environment (the Maasai cultural practices, the non-biotic resources and ecological processes, and the landscape). These characteristics are well understood by locals—mainly by elders. However, this understanding is currently being eroded among the younger generations by false conceptions of modernity, new values, increasing poverty and recently, by land subdivision. The combination of all these factors is disastrous for the local culture and, consequently, for wildlife—as local culture brutally transforms itself, its values for, understanding to and close relation with nature mutate as well. The Pardamat local residents interested in establishing a new conservation area in their lands, clearly stated that *"we need to understand that the [Maasai] Mara has always been a free-roaming space for wildlife, livestock and people,"* (comm. pers.) a clear perception of the wildlife-human interaction. Indeed, the symbiosis between the Maasai and their environment and wildlife is so crucial for their culture that elders literally and repeatedly mentioned that the cultural changes fostered by land subdivision mean the "*end of the world"* (comm. pers.) This delicate, intertwining relationship between the Maasai culture, their livelihoods and the Mara ecosystem, in particular the wildlife, needs to be recognized as the major condition for long term conservation. It is clear that none of these parts can prevail without the other—a characteristic that truly makes the Maasai Mara, above all, a cultural landscape.

As mentioned in the MMNR Management Plan draft (MMNR, 2009), over the long-term, the Maasai culture, with its affinity and tolerance towards nature and wildlife, has been a major factor in ensuring the continuing abundance of wildlife and their habitats in the Greater Mara Ecosystem. Its degradation and lost will contribute and aggravate other threats to wildlife

3.1.9. Infrastructure

Infrastructure may be an indicator of human development. However, when it is poorly planned and implemented, or built in sensitive areas, it rather causes negative effects on human wellbeing, the environment and wildlife. In the case of this plan geographical scope area, two major factors trigger fast and poorly planned infrastructure: human sedentarisation and tourism.

Sedentarisation leads to unplanned settlements, and consequently to the demand of services, such as health, education, and trade facilities, among others. Once these services are provided settlements become themselves in centres that call more people to settle-in, sometimes also attracted by work opportunities that tourism may provide. Tourism in turn, uses land resources for accommodation, tourism facilities and other infrastructure provision. Tough the major impact of sedentarisation and tourism is the development of road networks.

Roads severely interfere with migratory routes, cause direct wildlife mortality due collisions, and increases ecosystem fragmentation. They also enable easy access, and for that reason they open new areas for human migration, development and incompatible land uses with wildlife (Bedelain, 2013). As mentioned in the Agriculture section of this chapter (3.1.2., above), easy access to markets has been an important cause for agricultural development. For that reason, the project of tarmacking the road from Narok town to the MMNR's Sekenani gate is of major concern.

3.1.10. Sand Extraction and Pollution

The harvesting of sand from the Mara rivers is a significant issue in some areas of the greater Mara ecosystem, namely; Naikarra, Siana, Majimoto and a small section of Talek. The sand is used for the construction of houses in the nearby regional town of Narok and more recently is being transported for market in Nairobi. Additionally, KWS has identified a direct link between sand harvesting and the poaching of wildlife, with bush meat being found in lorries carrying sand and allegations that the transporter lorries can also be used to carry ivory and forest products like Cedar (*Juniperus procera*), Sandalwood (*Osyris lanceolata*) and Olea Africana (*Olea europaea* subsp. *africana*).

The extraction of sand is an increasingly important issue, especially within the context of changing weather and rainfall patterns, as the sand in rivers holds water during the wet season that is slowly released during the dry seasons. Further, the removal of sand destroys the riverine vegetation, which in turn causes instability to the river banks, the siltation of rivers and damage to river crossing points.

In other counties in Kenya, especially Kajiado and Machakos, they have imposed a ban on sand harvesting and Machakos is developing a bill to manage the harvesting of sand, as a valuable resource.

Pollution is mainly associated with pesticide use on farms, and is probably responsible for the disappearance of part of the flora, but also the disappearance of insects and birds. Some people have reported a kind of skin discoloration among hippos in rivers where the current is low (Association Tendua, n/d). However, pollution is also visible in towns, villages and they surrounding areas where poor or no disposal and management of waste are not only degrading human health, but also deteriorating water quality, wildlife, land, culture and scenic values.

3.1.11. Climate Change effects as new threat

Climate change is not necessarily deemed as a threat in OS-based conservation plans, although it is considered as the root cause of local effects that do represent serious threats to wildlife and ecosystems. There is an increasing corpus of scientific literature documenting climate change effects and forecasting scenarios (Galvin, 2009), however more research needs to be undertaken in order to clearly define what climate change effects need to be considered as threats and design proper mitigation or adaptation strategies.

In recent times the rainfall patterns of the Mara have become increasingly erratic, and drought is a pronounced consideration, with more regular periods of drought of increasing duration in recent years. The El Niño Southern Oscillation (ENSO) forces rainfall patterns out of phase and consequently is increasingly cited as being of major concern, primarily because both the wild and domestic animals are heavily reliant on the natural cycle of water availability and as well, the recent droughts have resulted in major economic and ecological change. A reduction in surface water availability has direct impacts for both wildlife and livestock populations alike. Firstly, it substantially elevates mortality rates and secondly drought will result in the more robust age groups surviving, producing an unnatural skew in the population dynamics (Serneels et al., 2001). Future changes in rainfall pattern and periodicity will likely have severe implications for the wildlife of the GME. For example Mduma et al. (1999) found that wildebeest numbers are significantly affected by rainfall in the dry season as it directly affects food availability, which in turn will directly affect predator numbers and survival rates.

Climatic erratic patterns will also aggravate other threats. Habitat fragmentation due to land use changes limit the access to dry season grazing and water on which the cattle and wildlife are critically dependent (Ogutu et al., 2011). Climate change will exacerbate this threat as the increased frequency and severity of droughts and floods that is expected to occur (IPCC, 2012) will modify vegetation growth and hence food availability for the migrating animals. The ability of migrants to respond to changing climatic conditions is likely to be further impaired by such man-made threats as habitat loss

and fragmentation (Ogutu et al., 2011).

This CNR-CAP has not yet designed strategies on climate change adaptation and mitigation, although it proposes to rapidly initiate studies leading to understand the effects and define interventions accordingly.

3.2. Threat analysis and rating

The threat analysis consists not only in assessing how each direct threat negatively affects each target, but also in having a better understanding of how different threats affect one target, and how the ensemble of targets is affected by one single threat. At the end of this analysis, one also has a more accurate perception of how all threats are impacting the ensemble of targets, in other words, the overall challenge that the plan is aiming to undertake.

Rating threats is also important from a strategic perspective, as it helps to focus actions on the ones that are most important to address. Again, it is important to consider the entire set of direct threats and not limit the analysis to the threats that the concerned organisations have the expertise or resources to address (CMP, 2013).

There are a number of threat rating tools for the purpose of analysing and rating threats. This process used the one based on ranking the severity, scope and irreversibility of each threat, as follows:

Severity: The level of damage to the conservation target that can reasonably be expected within 10 years under current circumstances i.e., given the continuation of the existing situation.

- Very High: The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.
- High: The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
- Medium: The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.
- Low: The threat is likely to only slightly impair the conservation target over some portion of the target's occurrence at the site.

Scope: Most commonly defined spatially as the geographic scope of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances i.e., given the continuation of the existing situation.

- Very High: The threat is likely to be widespread or pervasive in its scope and affect the conservation target throughout the target's occurrences at the site.
- High: The threat is likely to be widespread in its scope and affect the conservation target at many of its locations at the site.
- Medium: The threat is likely to be localized in its scope and affect the conservation target at some of the target's locations at the site.
- Low: The threat is likely to be very localized in its scope and affect the conservation target at a limited portion of the target's location at the site.

Irreversibility: The degree to which the impact of a source of a stress can be restored.

- Very High: The source produces a stress that is not reversible e.g., wetlands converted to a shopping centre.
- High: The source produces a stress that is reversible, but not practically affordable e.g., wetland converted to agriculture.
- Medium: The source produces a stress that is reversible with a reasonable commitment of resources e.g., ditching and draining of wetland.
- Low: The source produces a stress that is easily reversible at relatively low cost e.g., off-road vehicles trespassing in wetland.

Table 2: Threat Rating [5]

Threats \ Targets	Maasai culture	Woodlands	Water sources	Elephant	Lion	Forests	Grasslands	Wildebeest	Summary Threat Rating
Fencing	**High**	**Medium**		**Medium**		**Medium**	**Medium**	**High**	**High**
• Scope	High	Medium		High		Medium	High	High	
• Severity	High	Medium		High		Medium	High	High	
• Irreversibility	Medium	Medium		Low		Medium	Low	Low	
Uncontrolled grazing/ Overgrazing	**Medium**		**Medium**	**High**	**High**		**High**	**High**	**High**
• Scope	High		Medium	High	High		High	High	
• Severity	Medium		Medium	High	High		Medium	High	
• Irreversibility	Medium		Medium	Medium	Medium		Medium	Medium	
Unplanned settlements and urbanisation	**High**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**High**	**High**	
• Scope	High	Medium	Medium	High	Medium	Medium	High	High	**High**
• Severity	High	Medium	Medium	Medium	High	Medium	High	High	
• Irreversibility	Medium	Medium	Medium	High	High	High	High	High	

[5] Threat rating excludes World Class Tourism Destination in its analysis. As it impacted by how all threats affect the other targets it depends upon, it is not directly affected by any of the identified threats. However, the overall rate of "High" could be considered as a surrogate of the level of threat over the target.

Threats \ Targets	Maasai culture	Woodlands	Water sources	Elephant	Lion	Forests	Grasslands	Wildebeest	Summary Threat Rating
Infrastructure		**Medium**		**Medium**	**Medium**	**Medium**	**Medium**	**High**	**High**
• Scope		Medium		Medium	Medium	Medium	High	High	
• Severity		Medium		High	Medium	Medium	Medium	High	
• Irreversibility		High		High	High	High	High	High	
Charcoal (Logging/burning)		**High**				**High**			**High**
• Scope		High				High			
• Severity		High				High			
• Irreversibility		Medium				Medium			
Human-wildlife conflict				**High**	**High**		**Low**	**Medium**	**High**
• Scope				High	High		High	High	
• Severity				High	High		Medium	Medium	
• Irreversibility				Medium	Medium		Low	Medium	
Agriculture land use	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**
• Scope	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	
• Severity	High	Medium	Medium	High	Medium	High	Medium	Medium	
• Irreversibility	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium	

Threats \ Targets	Maasai culture	Woodlands	Water sources	Elephant	Lion	Forests	Grasslands	Wildebeest	Summary Threat Rating
Loss of Maasai culture		**Medium**	**Low**	**Medium**	**Low**	**Low**	**High**	**Medium**	**Medium**
• Scope		Medium	Low	High	High	Medium	High	High	
• Severity		Medium	Low	Medium	Low	Low	High	Medium	
• Irreversibility		High	Low	Medium	Medium	Medium	High	High	
Poaching				**Medium**	**Medium**			**High**	**Medium**
• Scope				Medium	Medium			High	
• Severity				High	Medium			High	
• Irreversibility				Medium	Medium			Medium	
Pollution	**Low**		**Medium**						**Low**
• Scope	High		Medium						
• Severity	Medium		Medium						
• Irreversibility	Low		Medium						
Sand extraction			**Medium**						**Low**
• Scope			Medium						
• Severity			Medium						
• Irreversibility			Medium						
Summary Target Rating	**High**	**Medium**	**Medium**	**High**	**High**	**Medium**	**High**	**High**	**High**

3.3. The Context: Causes and Effects of Threats to Conservation Targets

In the scope area, alternative and competing land uses represent as a whole the major threat for the conservation of ecosystems, wildlife, as well as for the Maasai culture. This is aggravated by focused threats to wildlife targets, such as poaching and human-wildlife conflict situations. The high level of threats is affecting considerably the Maasai Mara Conservancies pursuit of becoming a world-class tourism destination.

Diagram 2 shows the factors (yellow boxes) that lead to direct threats (pink boxes), interconnected one with each other in a web-kind of relationship. Structural problems (population increase, poverty) are certainly the base series of factors, though land-subdivision is playing a critical role in spilling over unprecedented level of threats. Land sub-division of communal land (previously known as "group ranches") has indeed led to the ability for each landowner to make individual choices on how the land will be used. Commercial and subsistence farming, as well as urban land uses, currently stand out as the leading alternatives. On face value these alternatives often provide a compelling improvement of returns for landowners when compared to traditional land uses, which are far more compatible to conservation, ecotourism and the preservation of the Maasai culture. Poor access to livestock markets and low quality breeds have added pressure to seek alternatives. It is the prolific increase of fencing of land that is the most obvious symptom of this threat, closing off open space and corridors for wildlife and dividing the community.

Aggravating the impacts of poaching and human wildlife conflict, habitat modification represents a change that results in the habitat becoming less suitable than it was previously to wildlife (Reid et al., 2004) and people as well. In the Mara this reflects conditions in areas that are heavily grazed by livestock but could still be utilised by wildlife such as in the heavily used areas in the former group ranches (Prins 1992). Fragmentation is the 'breaking up into smaller pieces' of suitable areas in a landscape (Reid et al., 2004). Both habitat loss and modification can contribute to fragmentation and the severity of the effect is highly dependent on the scale of the change and the target species.

Habitat loss, contraction and fragmentation resulting from the direct threats to ecosystem targets have all been suggested as prevalent causes in the decrease of wildlife numbers in areas that historically sustained large numbers (see Ogutu et al., 2011; Ogutu et al., 2010; Ogutu et al., 2009; Fryxell et al., 2005; Sinclair et al., 1995). Reid et al., (2004) describe the principal processes of habitat change, all of which can be attributed to increased human activity in the context of the Mara ecosystem. Habitat loss, or conversion, directly modifies the composition of a landscape by transforming 'suitable habitat' into a habitat that has reduced in quality to no longer be 'entirely suitable'. In the Mara this is attributed to expanding permanent settlements and trading centres, conversion of rangeland to cropland, and the erection of impenetrable fences (Reid et al., 2004). In areas where the incidence of livestock grazing is high, wild herbivores, which vary between grazers, browsers and mixed feeders, often diminish in numbers as a result of disturbance and competition for food (Riginos & Young 2007). In addition, intensive livestock grazing has frequently been linked to shrub encroachment in sub-Saharan Africa (Scholes & Archer 1997; Asner *et al.,* 2009; Roques *et al.,* 2001; Cabral *et al.,* 2003; Sankaran *et al.,* 2008); which results in a decrease in palatable herbaceous vegetation and an increase in unpalatable woody vegetation (Scholes and Walker, 1993).

As human populations grow, so too does their demand for land, increasing fragmentation and isolation of wildlife populations. In the last 100 years lions have lost 75% of their former range due to progressive intensification of land use, sedentarisation, diversification of livelihoods and land fragmentation through privatization of land tenure driven by dynamic socio-political, demographic and economic processes (Riggio et al., 2012). The confinement and concentration of elephants in declining ranges with reduced allowance for seasonal migration is causing elevated densities and habitat destruction that can be detrimental to species diversity and to elephants themselves.

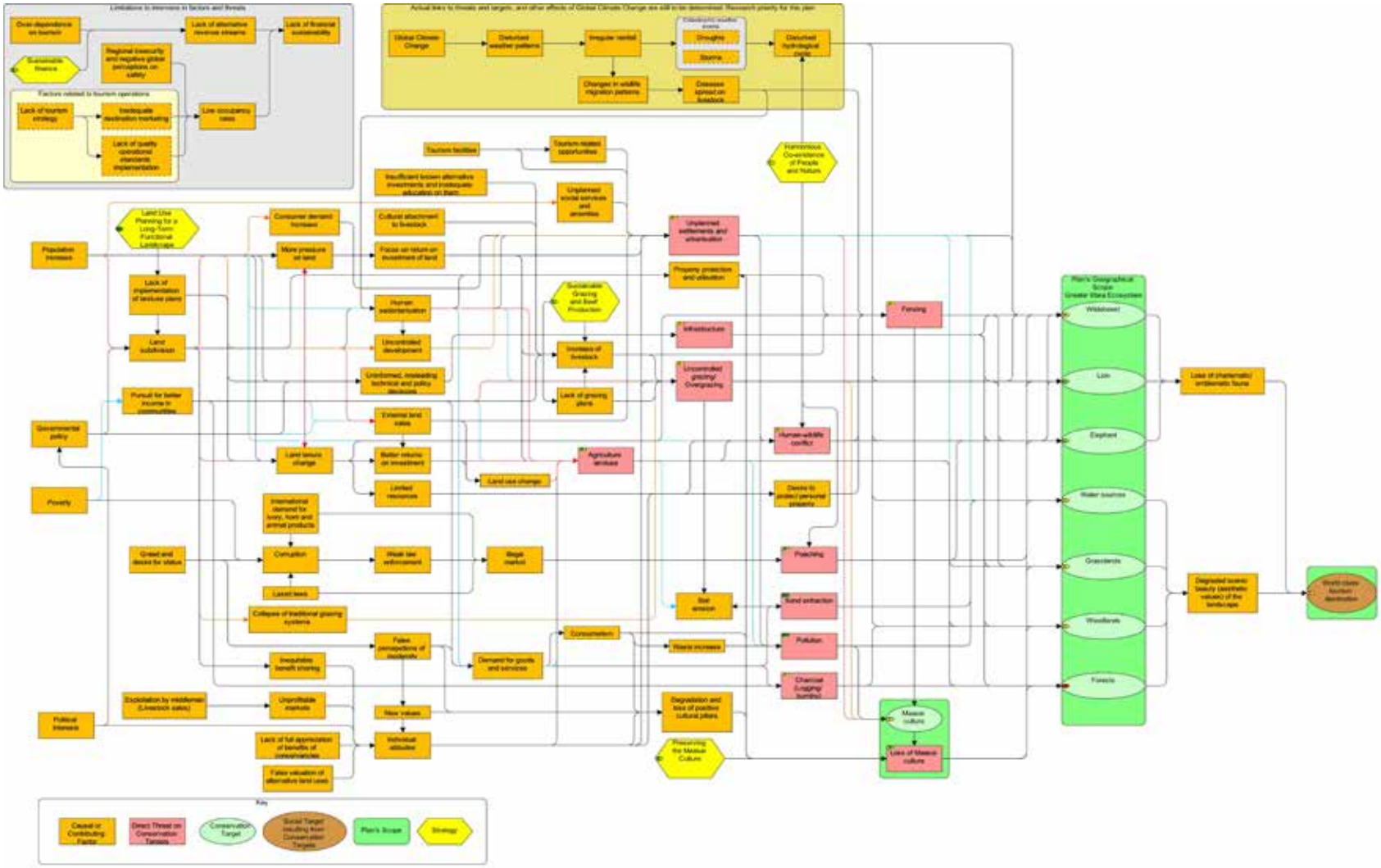


Diagram 1: Scope Area Conceptual Model

Definition of the boxes and ovals in Diagram 2

Causal or contributing factors (yellow boxes): Contextual factors, usually negative factors, that cause a threat or another causal factor, or contribute to their existence.

Direct threat on conservation targets (pink boxes): The proximate human activities or processes that have caused, are causing or may cause negative impacts to the viability of conservation targets. They should not be confused with "stressors" (for instance, fragmentation), which are the effect of a threat in a target.

Conservation targets (light green ovals): Biological features such as species, communities and ecological systems that represent and encompass the full array of biological diversity found in the plan's geographical scope area, and/or non-biological elements that are worthy to conserve because of their intrinsic values and relation with the biological conservation targets, such as the Maasai Culture, in this case.

Social targets resulting from conservation targets (brown oval): Also known as Human Wellbeing Targets, as per the OS jargon, they refer to non-biological targets that result from biological targets' conservation via the ecosystem services that the later provide.

Plan scope (dark green box): The area where the biodiversity or cultural features of interest are located, where most of the strategies take place, and where positive changes resulting from the strategies are expected to happen.

Strategy (light yellow hexagons): Interventions aimed to achieve conservation objectives and goals, or support other strategies implementation. The hexagons and respective arrows in this diagram refer to the intervention entry points that were identified to design strategies upon.

4. Stakeholder analysis

The most important stakeholders related with the context of the scope area appear on table XX. Stakeholders are social groups, agencies, organizations, or individuals who are playing a role in the current overall situation that affects the conservation targets, and may have a direct or indirect interest or role to play in the plan's implementation and expected results.

The table below shows for each stakeholder identified what their current situation is vis-à-vis the context depicted in the Conceptual Model. Some stakeholders benefit (+), some others are negatively affected (-), whereas in some cases they both benefit and are negatively affected. The second column reflects what is their current contribution in solving the negative factors that affect conservation. As usual in this plan, the rating is based on the 4-level scale, from Low to Very High (including Medium and High). By recognising their current role in conservation and their level of power, their expected role in this plan was assessed, as well as the overall importance.

Based on this analysis, one can easily identify 3 groups of stakeholders

a) Stakeholders most directly implicated:

This group encompasses the stakeholders who have an overall importance rated as Very High. They currently play important roles in coordination and planning participation, and/or will have a critical participation in the plan's implementation and support. Not all of them have a current active positive role. Non-conservancy landowners, for instance, do not provide any contribution to conservation, although it is expected they will join conservancies and/or undertake conservation-related conservation initiatives. The stakeholders in this group integrate the 3 major social sectors relevant for this plan: communities (conservancy and non-conservancy landowners and their families); tourism (tourism partners), and conservation parties, the latter including direct implementers on-the-ground (MMWCA, conservancy managers), or supporting agencies at local, county or national levels (KWCA, NEMA, Ministry of Tourism and Wildlife, KWS).

b) Relevant stakeholders:

This group includes surrounding communities on which the plan expects to have an impact on, and institutions or organisations that can have a critical role in supporting, contributing or implementing different activities of this plan, such as the County Government, conservation NGOs, academia and researchers, churches and religious organisations.

c) Other accompanying stakeholders

The third group includes other stakeholders that can support some activities or processes needed for the plan's success. It includes, but is not limited to the National Government and other NGOs.

Table 3: Stakeholder Analysis (explanations for columns follow the table)

Stakeholder	Current situation*	Contribution**	Current role in conservation	Current level of power***	Expected or potential role in the plan	Overall importance
MMWCA	(-)	M>H	Coordination Stakeholder mobilization Implementation Fundraising Public awareness	M>H	Planning Fundraising Programme mgt. Lobbying	VH
Conservancy landowners	(+)(-)	M>H	Conservancy planning Awareness Coordination Influencing Provision of lands (Set aside lands for conservation) Planning Operation Governance	VH	Ownership Influence, implementation of plans, monitoring, accountability, decision making Provision of lands Operation Governance Plan implementation, Influencing decision making on policies	VH
Tourism partners	(+)(-)	VH	Financing Employing Planning Marketing CSR/Trust Investment Tourism product devpt. Implementation Operations Security Bring income, fundraising	H	Planning Implementation Engagement Continuing existing role Marketing, funding	VH
Conservancy managers	(-)	H	Mediation, policing, security, settlement planning, grazing planning, employment	H	Responsibility of planning implementation, existing role	VH
Non-conservancy land owners	(+)	L	None	VH	Join conservancies Conservation support	VH
KWCA	(-)	L	Policy Advocacy	VH	Policy Advocacy Fundraising	VH

Stakeholder	Current situation*	Contribution**	Current role in conservation	Current level of power***	Expected or potential role in the plan	Overall importance
NEMA	(-)	L	Quality control Licencing	VH	Improve current rule	VH
County Ministry of Tourism & Wildlife	(=)	L	None	H	Regulation Legislation, Implementation	VH
KWS	(-)	L>M	Oversight	M>H	Law enforcement, security	VH
Surrounding communities	(=) / (+)	M	Hosting wildlife and conservancy land owners, charcoal, poaching, human-wildlife conflict	M	Participation, conflict management, benefit sharing, vision ownership	H
CWCCC	(-)	L>M	Paying compensation, arbitration, conflict resolution, policy dialogue	M	Conflict resolution	H
Churches/ Religious organisations	(+)	L>M	Spiritual nourishment	VH	Positive influence on conservation	H
Conservation NGOs	(-)(+)	M	Facilitation planning, expertise, funding Fundraising, project support	L>M	Capacity building, lobbying Fundraising, technical advise	H
County Government	(+)	L>H	Revenue collection, licencing, security, regulation Governance	H>VH	Spatial planning, infrastructure, support of the CAP funding	H
Academia and researchers	(-)(+)	L	Data collection, monitoring, analysing, communication	L	Ecological monitoring, research	H
National Government	(+)	L	Policy, regulation, security, licencing	H	Funding, marketing	M
Other NGOs	(+)	L>M	Economic development	M	Coordinate with MMWCA	M

* **Current situation**: Determines the effect of current situation in particular stakeholders. Some of them may benefit (marked with a (+) symbol, e.g. by using land or natural resources; obtaining financial gains; gaining power; increasing their institutional presence. Some other stakeholders may be negatively affected (marked with a (-) symbol), e.g. by suffering effects of natural resources misuse or by not achieving their institutional objectives. In some cases, stakeholders may both benefit and be affected at the same time. This case includes, for instance, those stakeholders who gain a regional institutional presence but have difficulties in achieving their institutional goals. A fourth case, marked with a (=) symbol includes those stakeholders who play a rather neutral role in the current context.

** **Contribution**: Refers to the current (not expected) contribution of the stakeholders in solving the present situation.

*** **Current level of power**: Shows the perceived level of power of a given stakeholder for critical decision-making.

5. The conservation strategies

Conservation strategies are the response to the most critical threats identified. Through the management, reduction or abatement of these threats, it is expected to improve the viability of conservation targets.

Conservation strategies are designed taking as starting point the conceptual model (Diagram 1), where strategic "entry points" for intervention are identified. Negative factors are then transformed into positive results, to which other positive, necessary results are added in order to create a "result chain" that depicts the general working assumption of the strategy. These resulting diagrams are shown in Annex 1. The working assumption statements, called Theories of Change, are at the beginning of each conservation strategy description.

5.1. Strategy 1: Land Use Planning for a Long-Term Functional Ecosystem

5.1.1. Theory of change

If we establish and implement a CNR-CAP zone-wide ecosystem management plan, integrating together the management plans of the individual conservancies, as well as developing plans for existing areas not covered by conservancies, informed by the CNR-CAP, as well as embedded within the Narok County Spatial Plan; *And if*, these plans gazette rural/urban planning guidelines that integrate cultural aspects and are implemented within 3 km border of the MMNR and the conservancies

And if, these plans integrate optimal and equitable benefit sharing and incentives for landowners and their families, including income-generating enterprises for communities;

And if, registered leases are maximised and secure land, for the purpose of conservation

And if, land sales for incompatible land uses are minimised inside and outside of Conservancies, with fencing minimised through maximising communal land use and management

Then we will expand lands suitable for conservation and sustainable land management, minimising incompatible land uses and unsustainable practices, reducing the rate and extent of fencing, allowing degraded areas to be restored and increasing land resilience as well as connectivity across the landscape, thereby making the Greater Maasai Mara region a long-term functional ecosystem.

5.1.2. Objectives, general activities and action to implement in the first year

Objective LUP 1: *By mid-2016, the CNR-CAP for the Maasai Mara conservancies has been approved; its implementation has started and is informing planning processes at conservancy, Greater Mara Ecosystem and Narok County levels.*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 1.1 Finalise the CNR-CAP document by December 2015	• Finalise the vision, targets, strategies, threats & challenges for the Conservation Action Plan • Finalise the CNR-CAP geographical zoning plan • Key stakeholders and MMWCA board validate the CNR-CAP • Distribution of CNR-CAP to authorities and other parties	MMWCA & TNC, w/ key contributing parties
LUP 1.2 Update or finalise management plans in each individual Mara conservancy	• Identify the status of exiting conservancy management plans • Develop a standard Mara conservancy management plan format, based on the 2013 Wildlife Act guidelines, existing	MMWCA with individual conservancies and a

	conservancy plans and critical issues identified in the CNR-CAP • Assist individual conservancies to either finalise or develop their respective plans • Identify costs and funding for formation of individual management plans	consultant
LUP 1.3 Develop ecosystem plan for the Greater Mara Ecosystem informed by the CNR-CAP and cluster of Mara conservancies' plans	• Develop an action plan with KWS • Bring together plans from 2-3 conservancies in a geographical cluster, into a macro conservancy plan, e.g., within the central section of the Mara, incorporating the wedges between the conservancies and neighbouring unprotected areas • Raise matched USAID funds for development of macro-conservancy plans and for undertaking the ecosystem plan	MMWCA, w/ AWF & KWS w/ planning expertise
LUP 1.4 Plans developed for non-conservancy areas or/and conservancies in development	• Identify unprotected areas, or conservancies in development for plan development • Develop plans for areas with funds already available	MMWCA plus key partners like WWF
LUP 1.5 Monitor and assist the development of the Narok County spatial plan	• Monitor the progress of the Spatial Plan and assist as possible in relation to the section for the greater Mara ecosystem	MMWCA planning related expertise

Objective LUP 2: *By December 2017, develop and gazette rural/urban planning guidelines that integrate cultural aspects and implement within 3 km border of the MMNR and conservancies areas* **(Shared with the Objective PMC 2, in the Preserving Maasai Culture Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 2.1/PMC 2.1 Develop Rural/urban planning guidelines	• Rural/urban planning guidelines developed • Awareness and lobbying for rural/urban planning guidelines within 3 km of Reserve and conservancies	TBD
LUP 2.2/PMC 2.2 Implement Rural/urban planning guidelines	• Assist county government in developing rural/urban planning framework for 3 km outside of MMNR and conservancy boundaries	TBD

Objective LUP 3: *By December 2018, benefits from conservancies are optimal and equitable for landowners and their families, including income-generating enterprises for communities* **(Shared with Objective FIS 5 from Financial Sustainability Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 5.1/LUP 3.1 Identify the Mara equitable and optimal benefit model	• Build on work to date, undertaken by AWF • Engage across Mara stakeholders and undertake process to gain agreement on the key points of a maximised benefit model	MMWCA & AWF

FIS 5.2/LUP 3.2 Establish optimal and equitable benefits	• Compare existing benefits with the optimal model – develop an action plan for the way forward	MMWCA & AWF
FIS 5.3/LUP 3.3 Progress conservation sensitive income-generating businesses	• Identify viable business initiatives • Develop business and action plans for priority initiatives	MMWCA w/ AWF and other key Mara stakeholders
FIS 5.4/LUP 3.4 Implement conservancies' benefit communication campaign	• Develop formal campaign for roll-out, building on work to date • Roll out campaign	MMWCA - Communications - OOMT

Objective LUP 4: *By December 2017, 90% of land leases are registered as land under conservation, across all operational conservancies and compliance is enforced.*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 4.1 Register of leases for land under conservation, across the Mara conservancies	• Continue administration and processing of land leases, X% per year (to be defined) across all operational conservancies • Engage Ministry of Lands/Lands office to agree to an efficient and cost-effective way of registering land across the greater Mara ecosystem • Raise matched USAID funds for lease registration fees and associated costs	MMWCA w/ individual conservancies
LUP 4.2 Establish Fund for conservancies and conservancy land owners, to fund additional land purchases for conservancies and stop land being sold	• Fund established with USAID funding • Raise matched USAID funds for purchase of land	MMWCA w/ key partners
LUP 4.3 Early renew of conservancy land agreements across conservancies	• Idea floated during 2016, to see what timeline is feasible	MMWCA w/ individual conservancies

Objective LUP 5: *By December 2018, land sales for incompatible land uses are minimised inside and outside of Conservancies, and by December 2019 the area under fencing is minimised through maximising communal land use and management* **(Shared with the Objective PMC 3, in the Preserving Maasai Culture Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 5.1/PMC 3.1 Undertake land use valuation study	• Initiate and undertake valuation study • Outreach communications to disseminate results of study • Agreement across the multiple agents, about the optimal, sub-optimal and worse land uses	MMWCA w/ AWF and MMU (w/ international university)

	• Disincentives against fencing and other incompatible land uses developed	
LUP 5.2/PMC 3.2 Build on the 2015 fencing research, map and evaluate land use across the region	• Map the land uses of the Mara ecosystem, building on the work done to date for Koyaiki (Total area, number of plots)	MMWCA w/ key partners, e.g., OOMT
LUP 5.3/PMC 3.3 Establish Conservation Areas across broader area as per the agreed CNR-CAP geographical zone	• CNR-CAP geographical zoning plan finalised (as above)	MMWA w/ key partners
LUP 5.4/PMC 5.4 Regulate land sales across the Mara conservancies and neighbouring areas	• An across the Mara conservancies land administration process established • A fund set up (as per point LUP 4.2) through which to keep/buy land in the Conservancies, established through USAID funds • Raise matched USAID funds for purchase of land	MMWCA

Objective LUP 6: *By December 2018, the areas under protection or/and sustainable land use have increased by 100%, from the existing 1,000km^2 (outside the Reserve) to 2,000km^2 (of the proposed 3,000km^2 for the CNR-CAP geographic scope area)*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 6.1 Prioritise areas for expansion of conservancies and conservation areas across the unprotected Greater Mara Ecosystem	• Map all unprotected areas, within the CNR-CAP agreed zone, identifying all migratory routes and corridors, areas and features of specific natural resource importance, etc. • Identify existing land use, categorising if compatible or incompatible to land resilience and conservation	MMWCA w/ expertise
LUP 6.2 Engage land owners	• Engage landowners within priority areas • Identify, assess and agree on the best land use • Raise funds for the operation of Conservation Areas in these existing unprotected areas • Continue development of prioritised areas: Siana, Pardamat, escarpment region	MMWCA w/ expertise

5.2. Sustainable Grazing and Beef Production

5.2.1. Theory f Change

If the conservancies and surrounding areas across the CNR-CAP zone implement sustainable grazing plans which incorporate sustainable stock rates and take into account both wildlife and livestock grazing,

And if, we increase returns from community cattle through better markets demanding good quality livestock from Mara landowners and commercialised market practice by the Maasai along with improved animal husbandry within a context of conservation conditionality

And if, cattle business plans with sufficient investments to enable sustainable commercial cattle production practices across the conservancies and surrounding areas of the CNR-CAP zone are agreed and implemented;

Then we will increase the resilience of the Mara's rangelands, the value, productivity and income generated by livestock, while reducing livestock stock rates, unsustainable land uses, and impacts on wildlife

5.2.2. Objectives, general activities and action to implement in the first year

Objective SGB 1: *By December 2017, sustainable grazing plans for conservancies and community areas with sustainable stocking rates, are developed and implementation has started*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
SGB 1.1 Establish optimal livestock (cattle and shoat) density per hectare across the Mara regions, considering wildlife grazing needs	• Identify land carrying capacity for various regions of Mara (incorporating rainfall, quality of soils, etc.), taking into account wildlife and livestock grass consumption needs • Develop and initiate grasslands monitoring system	MMWCA w/ key partners, including conservancies and existing livestock players
SGB 1.2 Implemented guidelines for sustainable grazing plans across Mara conservancies	• Sign off on developed guidelines across all Mara conservancies or/and compatible adapted versions • Implement across half of the Mara's operational conservancies	MMWCA w/ individual conservancies
SGB 1.3 Implemented guidelines for sustainable grazing plans across community areas outside of conservancies, but within the CNR-CAP geographical scope	• Design a program that facilitates community livestock to be managed in a sustainable way across community areas outside of conservancies	

Objective SGB 2: *By December 2017, increase returns from community cattle through better markets and market practice by the Maasai, quality breeds and fattening practices, within the context of conservation conditionality*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
SGB 2.1 Identify and establish access to multiple livestock markets, with	Building on work undertaken during 2015: • Baseline survey on existing market prices	TBD – to include existing livestock related

higher return on investment than existing markets	• Identification of markets with higher return on investment • Develop mechanism / entity to organise bulk sales of livestock to gain higher bargaining power • Make agreements with identified market outlets providing best return on market	players in the Mara
SGB 2.2 Establish animal husbandry and quality breeding	Building on work undertaken during 2015: • Finalise an outreach program to enable the community cattle to be upgraded, including as required a breed exchange program	TBD – to include existing livestock related players in the Mara
SGB 2.3 Implement conservancy or/and conservancy neighbouring lands cattle fattening program	Building on work undertaken during 2015: • Finalise a program to enable the community cattle to be fattened inside conservancies	TBD – to include existing livestock related players in the Mara
SGB 2.4 Improve market practice by the Maasai livestock owners	Building on work undertaken during 2015: • Community outreach campaign designed and start up	TBD – to include existing livestock related players in the Mara

Objective SGB 3: *By the end of 2016, cattle business plans for the conservancies will be finalised and funds for investment will be secured*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
SGB 3.1 Develop cattle business plans for the conservancies	• Building on the work undertaken during 2015, a suitable specialist hired as required to finalise business plans for one or different scenarios across the Mara • Approve business plan for implementation across at least 2 conservancies	MMWCA w/ key partners & individual conservancies
SGB 3.2 Raise investment funds for the cattle business plans	• On the back of the business plans, develop suitable investment proposals • Identify and submit proposals to suitable donors • Secure successful funds	MMWCA w/ key partners & individual conservancies
SGB 3.3 Implement business plan model through investment funds	• Start implementation of the adopted business plan	TBD

Objective SGB 4: *By December 2020, majority of households keep sustainable livestock numbers relative to available gazing range*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
SGB 4.1 Gain agreements	• Achieve in 1-2 conservancies	MMWCA w/

from both conservancy and non-conservancy landowners to keep sustainable livestock numbers based on carrying capacity and improved breeds w/ higher ROI		individual conservancies
SGB 4.2 Roll out outreach communications campaign for sustainable numbers	• Develop communications' campaign strategy and start roll out	MMWCA w/ key partners
SGB 4.3 Put Narok County Government policy and legislative framework in place to support sustainable practices	• Identify existing relevant policy and legislative framework	MWMCA

5.3. Preserving the Maasai Culture

5.3.1. Theory of Change

If the Maasai community remains proud of their cultural pillars, the respectful relationship with their natural environment is revitalised;

And if, compatible rural/urban planning is implemented across the greater Mara landscape;

And if, communal land use and sustainable livestock raising are promoted;

Then the Maasai Culture will be preserved and its relation with wildlife and environment will again be harmonious

5.3.2. Objectives, general activities and action to implement in the first year

Objective PMC 1: *By December 2016, the principle Maasai cultural pillars are defined and the Mara-wide cultural pride campaign is underway*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
PMC 1.1 Identify and clearly define the principle cultural pillars of the Maasai people and their relation with the environment	• Identify key stakeholders to participate in this process (elders, community leaders, anthropologists, etc.) • Design the process (Interviews, workshops, validation meetings) to define pillars and disseminate the results • Create a baseline and action plan on cultural awareness and pride, with indicators to measure success • Iniciate a mobile cultural pride campaign team, that rotates in different communities (e.g. between weekly markets and community gatherings) with an innovative « story-telling » approach of re-inforcing positive cultural pillars	MMWCA
PMC 1.2 Design and implement a Cultural Pride Campaign	• Identify key local and external partners (local government, education institutions, RARE) • Design concept of the campaign • Develop action plan, including required resources and key players • Get support of national and county government and institutions • Link behaviour changes to conservation outcomes on the ground (i.e. fencing, grazing, etc.)	MMWCA
PMC 1.3 Create a Maasai Cultural Interpretation Centre and related web site	Design concept of the Centre & website	MMWCA

Objective PMC 2: *By December 2017, develop and gazette rural/urban planning guidelines that integrate cultural aspects and implement within 3 km border of the MMNR and conservancies areas* **(Shared with Objective LUP 2, from Land Use Planning Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 2.1/PMC 2.1 Develop rural/urban planning guidelines	• Rural/urban planning guidelines developed • Awareness and lobbying for rural/urban planning guidelines within 3 km of Reserve and conservancies	TBD
LUP 2.2/PMC 2.2 Implement rural/urban planning guidelines	• Assist county government in developing rural/urban planning framework for 3 km outside of MMNR and conservancy boundaries	TBD

Objective PMC 3: *By December 2018, land sales for incompatible land uses are minimised inside and outside of Conservancies, and by December 2019 the area under fencing is minimised through maximising communal land use and management* **(Shared with the Objective LUP 5, Land Use Planning Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
LUP 5.1/PMC 3.1 Undertake land use valuation study	• Initiate and undertake valuation study • Outreach communications to disseminate results of study • Agreement across the multiple agents, about the optimal, sub-optimal and worse land uses • Disincentives against fencing and other incompatible land uses developed	MMWCA w/ AWF and MMU (w/ international university)
LUP 5.2/PMC 3.2 Build on the 2015 fencing research, map and evaluate land use across the region	• Map the land uses of the Mara ecosystem, building on the work done to date for Koyaiki (Total area, number of plots)	MMWCA w/ key partners, e.g., OOMT
LUP 5.3/PMC 3.3 Establish Conservation Areas across broader area as per the agreed CNR-CAP geographical zone	• CNR-CAP geographical zoning plan finalised (as above)	MMWA w/ key partners
LUP 5.4/PMC 5.4 Regulate land sales across the Mara conservancies and neighbouring areas	• An across the Mara conservancies land administration process established • A fund set up (as per point LUP 2.2) through which to keep/buy land in the Conservancies, established through USAID funds • Raise matched USAID funds for purchase of land	MMWCA

Objective PMC 4: *By December 2020, positive changes regarding cultural awareness and pride, and are reported*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
PCM 4.1 Annually track monitoring indicators	• End of year monitoring	TBD
PCM 4.2 Link behaviour changes to conservation outcomes on the ground (i.e. fencing, grazing, etc.)	• Incorporate indicators into annual monitoring	TBD

5.4. Harmonious Coexistence of People and Nature

5.4.1. Theory of Change

If we improve our understanding of the Mara's wildlife population dynamics and distribution patterns, its role in the GME, the external factors that impact it, and its influences in the surrounding human population;

And If we understand the Mara's human population dynamics and its impacts on current and future livelihoods, engaging communities to accept and practice population control;

And if, we empower community rangers and enhance appreciation of wildlife by communities;

And if, we embrace good natural resource management and sustainable use for charcoal production, forest cover, surface water and soils

And if, we have a better understanding of climate change impacts in order to undertake adaptation and mitigation measures

Then we will maintain stable wildlife populations and distribution across the Greater Maasai Mara ecosystem, and we will reduce the human footprint on the environment and wildlife, creating a harmonious co-existence of people and nature, for the benefit of wildlife, community and livelihoods.

5.4.2. Objectives, general activities and action to implement in the first year

Objective HPN 1: *By December 2017, the number of families practicing family planning has doubled compared to the early 2016 baseline and by December 2020 population growth rate across the Mara has stabilised to the national average of 2%*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 1.1 Collect and analyse population data to determine way forward, building on the existing analysis for the central Koyiaki region	• Replicate existing study to eastern and western sections of the Mara region • Identify causes and means of stopping high population growth rate • Start to put into action identified ways forward	MMWCA w/ OOMT
HPN 1.2 Develop and implement a family planning programme	• Engage family planning specialists and develop an action plan • Engage and sensitise communities • Distribute family planning methods	TBD w/ health authorities, local clinics & hospitals

Objective HPN 2: *By December 2018, the number of illegal acts concerning wildlife is reduced by 60% compared to the early 2016 baseline*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 2.1 Ensure the enforcement of laws and regulation by appropriate authorities	• Engage law enforcement agencies • Continued outreach training and information on the relevant laws and regulations	TBD
HPN 2.2 Build the capacity of communities and community rangers to manage and secure wildlife	• Train and equip existing community rangers through US-INL funds • Sensitise community members to the importance of the work by the scouts • Undertake exchanges with other areas facing	TBD

	similar challenges to plan and work jointly, and to be more effective and successful on the ground	
HPN 2.3 Put in place compensation and insurance with checks and balances	• Assess existing schemes across the Mara (and conservancies in Kenya) to identify recommendations on the best way forward • Investigate insurance options in the market place	TBD
HPN 2.4 Revitalise and in some cases develop the appreciation of wildlife by communities	• Develop outreach communications campaign and start roll-out	MMWCA

Objective HPN 3: *By December 2018, reduce dependency on charcoal by 40% and encourage the use of alternative energy sources (climate mitigation and adaptation)*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 3.1 Implement sustainable charcoal production and energy projects in at least four sites in Nyakweri and Lemek for demonstration purposes	• Showcase efficient charcoal production techniques and alternative energy in two sites (one in each location) • Undertake exposure tour for opinion leaders of each community to Kakuzi Sosambu and develop recommendations on way forward	TBD
HPN 3.2 Create charcoal associations in Nyakweri and Lemek	• Mobilise opinion leaders in each community around the creation of an association • Register the Association	TBD
HPN 3.3 Make available subsidised alternative cooking methods and materials	• Establish micro-business(es) with focus on alternative energy • Do exposure tours for entrepreneurial individuals to relevant study sites	TBD
3.4 Undertake an outreach HPN campaign to spread the use of alternative energy sources	• Develop outreach campaign and start to roll out	TBD

Objective HPN 4: *By 2020, forests net loss in area and volume is reduced by 60% compared to 2015 baseline (climate mitigation and adaptation)*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 4.1 Ensure the enforcement of laws and regulation by appropriate authorities in forest protection	• Engage law enforcement agencies • Outreach training and information on the relevant laws and regulations	TBD

HPN 4.2 Establish community forest association	• Bring KFS to initiate CFA formation, incorporating learning from successful CFAs across Kenya • Undertake basic training for the CFA to enable its functioning	TBD
HPN 4.3 Promote use of alternative/sustainable construction materials in future structures	• Identify alternative building materials • Explore subsidies for alternative materials to encourage use •	TBD
HPN 4.4 Develop a carbon credit bush lands and forests programme (see FIS5 below)	• Research the potential of the Mara landscape (in particular this forested area) for establishing a carbon credit program, building on work undertaken to date	TBD
HPN 4.5 Establish nature based enterprises across conservancies	• Identify suitable nature based enterprises • Produce business plans in order of priority and link to national funds and micro-finance institutions	TBD

Objective HPN 5: *By December 2018, specific measures are in place to maintain year round flow of surface water (climate mitigation and adaptation)*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 5.1 Develop a water allocation plan and implementation	• Link with Lake Victoria Basin Commission and Chris Dutton, WRWA • Map water projects, involved entities and their roles and activities across the Mara ecosystem • Develop an action plan that aims to maintain year round flow of surface water	MaMaSe - WWF
HPN 5.2 Undertake actions to conserve soil cover	• Develop an action plan that aims to protect and sustain strong and fertile soil cover	MaMaSe – WWF

Objective HPN 6: *By 2018, understand and have in place measures to adapt or/and mitigate climate change impacts across the greater Mara ecosystem*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 6.1 Develop and implement a research program on the impacts of climate change across the greater Mara ecosystem	• Identify existing relevant research for east Africa and in particular Mara-Serengeti ecosystem to understand climate change impacts • Develop an adaptation and mitigation programme based upon existing and future impacts of climate change, informed by the CNR-CAP	MMWCA w/ partners
HPN 6.2 Implement climate related components of the CNR-CAP	• Implement climate related components (noted above) within the CNR-CAP, e.g., land-use planning, natural resource management: forests, wood and water	MMWCA w/ partners

Objective HPN 7: *By December 2018, a data bank and research facility is operational for the greater Maasai Mara's wildlife population dynamics, distribution patterns and impacts*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 7.1 Collate existing wildlife population data together and design a way forward, building on existing data practices and proposed models	• Review the existing information database and the Applied Research & Informatics Programme proposal to assess progress to date • Design a way forward that integrates all existing research, plus the MMNR and KWS related initiatives	Full program funds required
HPN 7.2 Establish regular ecological and wildlife monitoring (including indicator species) across Mara conservancies	• Identify the most suitable monitoring methodology for the conservation targets and threats (existing and potential) in the Mara conservancies • Implement the methodology across interested Mara conservancies • Establish a central depository for the data from the conservancies	MMWCA w/ conservancies and other expert parties
HPN 7.3 Establish a virtual research facility	• Seeks funds to establish an online research facility	MMWCA, w/ relevant initiatives

Objective HPN 8: *By 2018, suitable national and county policies that enable required wildlife interventions to manage population dynamics across the greater Maasai Mara are in place*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
HPN 8.1 Identify required wildlife management interventions as well as existing legislation and policies and the compatibility between the two	• Identify required potential interventions • Assess existing legislation and policies • Assess compatibility and gaps between the two	KWCA and MMWCA
HPN 8.2. Work at national and county levels to enable a policy or legal framework to implement required management interventions	•	

5.5. Financial Sustainability

5.5.1. Theory of change

If conservancies maximise revenue streams through; livestock enterprise, philanthropic support, carbon credits and other potential sources;

And if, conservancies streamline operational costs, while investments are made to engender landscape conservancy management and improved operations;

And if, benefits from conservancies are optimal and equitable for landowners and their families, with land lease payments at a uniform and agreed rate that is competitive with other land uses, plus other direct and indirect benefits, like nature-based income-generating enterprises for communities;

And if, conservancies gain increased support from county government, particularly in financial terms and legislative framework;

And if, the conservancies tourism sector develops a Mara-wide conservancies tourism strategy to elevate the conservancies product, while maximising tourism income and maintaining solid conservation practice

Then the long-term stability of conservancies will be secured thereby sustaining land under conservation

5.5.2. Objectives, general activities and action to implement in the first year

Objective FIS 1: *By December 2016, livestock enterprise(s) are established with the purpose of raising income for the Conservancies in the medium-term*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 1.1 Establish livestock enterprise and related projects	• Individual or/and across conservancies cattle enterprise model developed and agreed, with all key stakeholders • Raise investment funds for cattle enterprise • Determine way forward for shoat enterprises (if any)	MMWCA w/ conservancies

Objective FIS 2: *By December 2018, the potential of the Mara Ecosystem forests, bush lands and grasslands will be assessed in order to develop initiatives based on carbon credits*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 2.1 Assess the potential of the Mara landscape for establishing carbon-based projects, including but not limited to REDD+	• Undertake pre-investment research: value of forests, bush lands and grasslands for carbon sequestration • Raise funds for this pre-investment research or find alternative system	MMWCA w/ partners
FIS 2.2 Establish partnerships to develop at least one carbon based initiative	• Identify and contact key potential partners • Undertake pre-investment phases • Advocate for initiative • Develop MoU for a carbon based initiative for the Mara	MMWCA w/ partners

Objective FIS 3: *By December 2016, achieve financial support from philanthropic funding sources for both individual conservancies and cross-conservancies initiatives, e.g., costs of conservancy management*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 3.1 Secure funding and other non-financial support from philanthropic sources and alliances	• Source potential funders and submit applications for support • Develop fundraising communications campaign and start roll-out • Hold meetings and events as required to confirm funding sources	MMWCA w/ Communications and Fundraiser Officer

Objective FIS 4: *By mid-2017, all conservancies have streamlined their operational costs with investments made to engender landscape conservancy management and improved operations*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 4.1 Analyse current costs and potential economies of scale across the Mara Conservancies	• Analysis of existing costs • Analysis of potentially shared costs across conservancies • Identification of other opportunities for economies of scale	MMWCA w/ AWF
FIS 4.2 Realise economies of scale and other efficiencies	• Develop and present model • Validate and agree on model for implementation	MMWCA w/ AWF
FIS 4.3 Invest into conservancies	• Identify investment needs of Mara conservancies and develop proposals for investment of funds	MMWCA w/AWF

Objective FIS 5: *By December 2018, benefits from conservancies are optimal and equitable for landowners and their families* **(Shared with Objective LUP 3 from Land Use Planning Strategy)**

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 5.1/LUP 3.1 Identify the Mara equitable and optimal benefit model	• Build on work to date, undertaken by AWF • Engage across Mara stakeholders and undertake process to gain agreement on the key points of a maximised benefit model	MMWCA & AWF
FIS 5.2/LUP 3.2 Establish optimal and equitable benefits	• Compare existing benefits with the optimal model – develop an action plan for the way forward	MMWCA & AWF
FIS 5.3/LUP 3.3 Progress conservation sensitive income-generating businesses	• Identify viable business initiatives • Develop business and action plans for priority initiatives	MMWCA w/ AWF and other key Mara stakeholders
FIS 5.4/LUP 3.4 Implement conservancies' benefit	• Develop formal campaign for roll-out, building on work to date • Roll out campaign	MMWCA - Communications

communication campaign		OOMT

Objective FIS 6: *By December 2017, achieve county or/and national government financial support and legislative framework for conservancies*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 6.1 Advocate to authorities to agree their financial support and legislative framework for the Mara conservancies	• Develop communications campaign and start roll-out • Publically present CAP and gain in principal agreements for framework • Learn lessons from NRT on achieving financial support • Work with KWCA to identify legislative framework way forward	MMWCA w/ individual conservancies

Objective FIS 7: *By 2020, the conservancies are implementing a Mara-wide conservancies tourism strategy to maximise tourism income while maintaining solid conservation practice*

General activities	Actions to implement in Year 1 (2016)	Responsible person/other stakeholders involved
FIS 7.1 Determine and facilitate optimal bed density range	• Identify current bed densities • Identify criteria on which optimal bed densities are determined • Determine optimal bed density range across the Mara conservancies	MMWCA w/ AWF and the individual conservancies
FIS 7.2 Develop and implement a Mara-wide conservancies tourism strategy	• Develop the framework for a Mara-wide conservancies tourism strategy, emphasising conservancy-wide operational standards and a strong destination marketing component	MMWCA w/AWF
FIS 7.3 Increase revenues from tourism by strengthening the destination's image in key markets, growing direct marketing channels and addressing potential over-reliance on third-party agents	• Develop action plan on how to do this	TBD

5.6. Risks and potential negative impacts assessment

The planning process included a risk and potential negative impact assessment exercise, carried out with the aim of identifying and proposing prevention and mitigation measures to be directly included in the strategy design. Although this should be an important component of sound planning, risk and negative impact assessment seldom is included in the strategy making process. This assessment was made though the result chain analysis, using the methodology SBIA (Maldonado, Panfil & Richards, 2010). The results are shown in table 4.

Table 4: Risks and negative impacts

Result where risk or potential negative impact was found	Risk or potential negative impact	Strategy affected	Possibility	Magnitude	Proposed prevention or mitigation measures	Way prevention or mitigation was included in the CNR-CAP
Tourism income	Tourism income not reaching communities (Negative impact)	All	L	H	Transparency agents, audits, accountability Variable portion of license fees	Transparency needs to be part of periodic reporting back of the plan's progress
Income from grazing access	Poor income form grazing/livestock practices (Negative impact)	All/ SGB	H	M	Range land quality management	Access to markets and value chains included in SGB strategy
Improved financial sustainability	Lack of public funds (Risk)	FIS	H	M	County government engagement	County government engagement included in several strategies (LUP, SGB, FIS)
Settlement plan	Lack of political support (Risk)	LUP	M	M	Political goodwill	Same above
Sustainable livestock industry	Overstocking to exploit the market (Negative impact)	SGB	H	H	Spatial planning	Specific strategy on the subject
	Increased livestock infrastructure and fencing (Negative impact	SGB	M	H	Capping grazing access	Grazing planning (included in SGB)
CNR-CAP implementation	Inadequate/ insufficient funding (Risk)	All	H	H	Investment models	Specific funding strategy
Land under conservation increase	Degradation of unconserved areas (Negative impact)	LUP	H	H	Strengthening livestock associations	Livestock associations included in SGB
County Spatial Plan	Delayed Spatial Planning (Risk)	LUP	H	H	Push CAP to be incorporated	Engage county government considered in LUP
Enforcement of law and regulation	Weak enforcement of regulation (Risk)	HPN	H	H	Lobbying law enforcement agencies	Considered in LUP
Family planning	Opposition from cultural and religious grounds (Risk)	HPN	M	H	Trainings and campaigns	Considered in HPN

6. Monitoring Plan

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
Objective LUP 1: *By mid-2016, the CNR-CAP for the Maasai Mara conservancies has been approved; its implementation has started and is informing planning processes at conservancy, Greater Mara Ecosystem and Narok County levels.*	CNR-CAP validated by key stakeholders and MMWCA board	OP	Yes	CNR-CAP, Y1 work plan and zoning proposal approval	MMWCA	MMWCA	December 2015	N
	Updated management plans for conservancies implemented	OC	Yes (partial plan)	Updated plans presented to MMWCA	Conservancy managers	Conservancies	2016 and 2017 (for new plans)	L
				Work plans based on management plans	Conservancy managers	Conservancies	Annually	L
	GME plan considering CNCAP zoning proposal finalised	OC	No	Gazette publication	MMWCA, KWS, other conservation organisations	Narok County	When gazetted, before end of 2018	L
	Narok County Spatial plan considering CNR-CAP zoning proposal finalised	OC	No	Gazette publication	MMWCA and Narok County	Narok County	When gazetted, before end of 2018	L
Objective LUP 2 (PMC 2): *By December 2017, develop and gazette rural/urban planning guidelines that integrate cultural aspects and implement within 3 km border of the MMNR and conservancies areas*	Guidelines gazetted	OP	No	Gazette publication	TBD	Narok County	End 2017	L
	Area covered by satisfactory guideline implementation	OC	No	Field check	TBD	Field (3 km around MMNR and conservancy areas)	Annually, starting in 2018	M
Objective LUP 3 (FIS 5): *By December 2018, benefits from conservancies are optimal and*	Income realised by household	IM	No, baseline TBD	Survey	Mara Trust	Field (full scope)	Annually	M

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
equitable for landowners and their families, including income-generating enterprises for communities	Source of income	IM	No, baseline TBD	Survey	Mara Trust	Field (full scope)	Bi-annually	M
	Number of households and people directly benefiting of IGB	IM	No	Survey	MMWCA	Field (Full scope)	Annually	M>H
	People reached by campaign	OC	No	Survey (and others)	MMWCA (comms.)	Field (Full scope)	2 * year	M>H
Objective LUP 4: *By December 2017, 90% of land leases are registered as land under conservation, across all operational conservancies and compliance is enforced.*	Percentage of land leases registered	OC	Yes	Data collection	MMWCA	Full scope	Annually	H
	Number of lease breaches	OC	Yes	Data collection	MMWCA	Full scope	Annually	VH
Objective LUP 5 (PMC 3): *By December 2018, land sales for incompatible land uses are minimised inside and outside of Conservancies, and by December 2019 the area under fencing is minimised through maximising communal land use and management*	Map of optimal land uses and valuation study completed	OC	No	Field work and GIS	MMWCA w/ AWF and MMU (w/ international university)	Full scope	Annually	VH
	Area (ha) sold for incompatible uses comparable to 2016 baseline	IM	Underway	Field work and GIS	TBD	Full scope	Annually	VH
	Area (ha) under communal land use and management	IM	Underway	Field work and GIS	TBD	Full scope	Annually	VH
	New area (ha) under fencing compared to 2015 baseline	IM	Underway	Field work and GIS	TBD	Full scope	Annually	VH

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
	Area (ha) were fences are removed compared to 2015 baseline	IM	Underway	Field work and GIS	TBD	Full scope	Annually	VH
	Total fenced area comparable to 2015 base line	IM	Underway	Field work and GIS	TBD	Full scope	Annually	VH
	New conservation areas across the CNR-CAP scope	IM	Yes	Agreements, field work, GIS	MMWCA	Full scope	Annually	M>H
Objective LUP 6: *By December 2018, the areas under protection or/and sustainable land use have increased by 100%, from the existing 1,000km^2 (outside the Reserve) to 2,000km^2 (of the proposed 3,000km^2 for the CNR-CAP geographic scope area)*	Area (ha) under protection or/and sustainable land use	IM	No	Field work and GIS	TBD	Full scope	Annually	VH
	Number of new landowners engaged in conservation	OC	No	Survey	TBD	Full scope	Annually	M
Objective SGB 1: *By December 2017, sustainable grazing plans for conservancies and community areas with sustainable stocking rates, are developed and implementation has started*	Number of plans developed and already in implementation	OC	Yes	Plan collection and review	MMWCA w/ key partners, including conservancies and existing livestock players	Full scope	2 * year	M
	Area (ha) covered by sustainable grazing plans	OC	Partial	Plan review, GIS	Same above	Full scope	2 * year	M

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
	Level of compliance to the plans (i.e. optimal livestock density and guidelines respected)	OC	No	Plan review	Same above	Full scope	2 * year	M
Objective SGB 2: *By December 2017, increase returns from community cattle through better markets and market practice by the Maasai, quality breeds and fattening practices, within the context of conservation conditionality*	New markets accessed	OC	Yes	Sales report review	TBD	Community cattle associations/ Livestock enterprises	Quarterly	M
	Price per kg and unit	OC	Yes	Sales report review	Mara Beef	Community cattle associations/ Livestock enterprises	Quarterly	M
	Number of cattle sold via conservancy enterprises	OC	No	Sales report review	Mara Beef	Community cattle associations/ Livestock enterprises	Quarterly	M
	Income per household from community cattle	IM	Yes	Survey	MMWCA	Conservancies, communities	Annually	H
	Increase of income per household by community cattle	IM	Yes	Survey	MMWCA	Conservancies, communities	Annually	H

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
	Revenue per conservancy (per ha)	IM	Yes	Revenue report review	Conservancies	Conservancies	Annually	M
Objective SGB 3: *By the end of 2016, cattle business plans for the conservancies will be finalised and funds for investment will be secured*	Number of conservancies implementing cattle business plans	OC	Yes	Collect, review cattle business plans	Conservancies, MMWCA	Conservancies	End 2016	L
Objective SGB 4: *By December 2020, majority of households keep sustainable livestock numbers relative to available gazing range*	Number of agreements from both conservancy and non-conservancy landowners to keep sustainable livestock numbers	OP	Yes	Collect agreements	Conservancies, MMWCA	Conservancies, communities	Annually	M
	Legislative framework in place to support sustainable practices	OP	Yes	Gazette review	MMWCA/Narok County	Gazette	When gazetted	L
	Percentage of households keeping sustainable livestock numbers	OC	No	Survey	MMWCA	Communities	Annually	H
Objective PMC 1: *By December 2016, the principle Maasai cultural pillars are defined and the Mara-wide*	Key cultural pillars identified and validated	OP	Partial	Research	MMWCA and others TBD	Communities	2016	M

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
cultural pride campaign is underway	Percentage of people practicing/aware of pillars	OP	No	Survey and research	MMWCA and others TBD	Communities	2016 and then annually	M
	Cultural campaign project	OC	No	Project review	MMWCA and others TBD	Communities	2017	L
	Cultural campaign work plan, support and funds	OC	No	Work plan review Partners' MoUs review Budget review	MMWCA and others TBD	MMWCA	2017	L
	Cultural campaign events	OC	No	Work plan report review	MMWCA and others TBD	Communities	Annually	L
	Cultural interpretation centre and web site functioning	OC	No	Site visit, activity report check, visit reports	MMWCA and others TBD	Cultural interpretation centre Communities	Bi-monthly	L
Objective PMC 2: (See LUP 2)								
Objective PMC 3: (See LUP 5)								
Objective PMC 4: *By December 2020, positive changes regarding cultural awareness and pride, and are reported*	Positive changes on cultural pillars reported	IM	No	Pre-test, post-test and follow up surveys	MMWCA and others TBD	Communities	Annually	H
Objective HPN 1: *By December 2017, the number of families practicing family planning has doubled compared to the early 2016 baseline and by December 2020 population growth rate*	Population dynamics known for central Koyiaki, eastern and westerns regions of the Mara region	OP	Partially (only Koyiaki)	Research	TBD w/ health authorities, local clinics & hospitals	Eastern and westerns regions of the Mara region	2017	H

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
across the Mara has stabilised to the national average of 2%	Number of households implementing family planning	OC	No	Activity reports Survey	TBD w/ health authorities, local clinics & hospitals	Eastern and westerns regions of the Mara region	Monthly Annually	M>H
	Communities and area covered by family planning	OC	No	Survey	TBD w/ health authorities, local clinics & hospitals	Eastern and westerns regions of the Mara region	2 * year	M>H
	Pregnancy spacing increase	IM	No	Survey	TBD w/ health authorities, local clinics & hospitals	Eastern and westerns regions of the Mara region	Annually	M>H
Objective HPN 2: *By December 2018, the number of illegal acts concerning wildlife is reduced by 60% compared to the early 2016 baseline*	Number of active community rangers per conservancy or conservation area	OC	Yes	Ranger roster review	TBD	Communities, conservancies	2 * year	L
	Number of illegal acts reported	IM	Yes	Ranger reports	TBD	Communities, conservancies	Monthly	L
	Amount paid in compensation	OC		Reports	TBD	CWCCC, MMWCA, others TBD	2 * year	L
	Level of appreciation of wildlife by community members	OC	No	Survey	MMWCA	Communities	2 * year	M

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
Objective HPN 3: *By December 2018, reduce dependency on charcoal by 40% and encourage the use of alternative energy sources (climate mitigation and adaptation)*	Number of functioning charcoal associations	OC	Partial	Survey, desk survey	KFS, MMWCA	Communities, NGOs	2 * year	M
	Annual consumption of charcoal per household	OC	No	Survey	KFS, MMWCA	Communities (sample groups)	2 * year	M
	Number of families using alternative cooking methods and materials	OC	No	Survey	KFS, MMWCA	Communities (Sample groups)	2 * year	N
Objective HPN 4: *By 2020, forests net loss in area and volume is reduced by 60% compared to 2015 baseline (climate mitigation and adaptation)*	Number of communities with forest association	OP	No	Survey, desk survey	TBD	Communities, ONGs, KFS	2 * year	H
	Wood use per household (m^3)	OC	No	Survey	TBD	Communities, ONGs, KFS	Annually	H
	Number of families using alternative materials	OC		Survey	TBD	Communities, ONGs, KFS	Annually	H
	Forest and woodland net loss (ha and m^3)	IM	No	GIS analysis	TBD	Communities, ONGs, KFS	Annually	H

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
Objective HPN 5: *By December 2018, specific measures are in place to maintain year round flow of surface water (climate mitigation and adaptation)*	Map water projects, involved entities and their roles and activities across the Mara ecosystem	OP	Yes	Desk survey	MMWCA MaMaSe - WWF	ONGs	Early 2016	L
	Action plan to maintain year round flow of surface water incorporated to CNR-CAP	OP	No	CNR-CAP with action plan incorporated	MMWCA MaMaSe - WWF	CNR-CAP updated version	2018	L
	Action plan that aims to protect and sustain strong and fertile soil cover incorporated to CNR-CAP	OP		CNR-CAP with action plan incorporated	MMWCA MaMaSe - WWF	CNR-CAP updated version	2018	L
Objective HPN 6: *By 2018, understand and have in place measures to adapt or/and mitigate climate change impacts across the greater Mara ecosystem*	Actual impacts of climate change across the GME are known and documented	OP	Yes	Impacts of climate change in the GME report	MMWCA and partners	CNR-CAP updated version	Once, end of 2016	L
	Specific mitigation and adaptation plan is developed and added to CNR-	OP		CNR-CAP with action mitigation and adaptation plan incorporated	MMWCA and partners	CNR-CAP updated version	Once, end of 2017	L

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
	CAP							
Objective HPN 7: *By December 2018, a data bank and research facility is operational for the greater Maasai Mara's wildlife population dynamics, distribution patterns and impacts*	Biological monitoring plan in place for each one of the biological conservation targets	OC	Partial	Monitoring reports review	MMWCA	MMWCA	Annually	M
	Number of users of virtual research facility for the MM	OC	No	User counting	MMWCA	MMWCA	Quarterly	L
Objective HPN 8: *By 2018, suitable national and county policies that enable required wildlife interventions to manage population dynamics across the greater Maasai Mara are in place*	Number of wildlife management initiatives accompanied by an enabling policy	OC	No	Wildlife management intervention reports	MMWCA	MMWCA	Annually	M
Objective FIS 1: *By December 2016, livestock enterprise(s) are established with the purpose of raising income for the Conservancies in the medium-term*	Number of livestock enterprises established	OP	Yes	Desk survey	MMWCA and partners	Conservancies, communities	2 * year	L
	Income provided by livestock enterprises to Conservancies	IM	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA, conservancies, Livestock enterprises	Annually	L
	Percentage of CNR-CAP covered by livestock enterprises	IM	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA & conservancies	Annually	L

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
Objective FIS 2: *By December 2018, the potential of the Mara Ecosystem forests, bush lands and grasslands will be assessed in order to develop initiatives based on carbon credits*	Potential of Mara landscape for CO_2 assessed	OP	No	Report approval	MMWCA and partners	MMWCA	End 2016	L
	At least one carbon based initiative	OC	No	Carbon based initiative approval	MMWCA and partners	MMWCA	2017	L
Objective FIS 3: *By December 2016, achieve financial support from philanthropic funding sources for both individual conservancies and cross-conservancies initiatives, e.g., costs of conservancy management*	Funds secured from philanthropic sources	OC	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA & conservancies	Annually	L
	Percentage of CNR-CAP covered by philanthropic sources	IM	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA & conservancies	Annually	L
Objective FIS 4: *By mid-2017, all conservancies have streamlined their operational costs with investments made to engender landscape conservancy management and improved operations*	Percentage of reduction of operational costs	IM	Yes	Financial report review	Conservancies, MMWCA	Conservancies	2 * year	L
Objective FIS 5: (See Objective LUP 3)								
Objective FIS 6: *By December 2017, achieve county or/and national government financial support and legislative framework for conservancies*	Funds secured from public sources	OC	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA & conservancies	Annually	L
	Percentage of CNR-CAP covered by public sources	IM	Yes	Budget and financial report reviews	MMWCA w/ Communications and Fundraiser Officer	MMWCA & conservancies	Annually	L

Objective	Indicator(s)	Type	Does it exist data?	Method	Who is responsible?	Where to collect data?	Frequency	Estimated cost
Objective FIS 7: *By 2020, the conservancies are implementing a Mara-wide conservancies tourism strategy to maximise tourism income while maintaining solid conservation practice*	Level of compliance to the optimal bed density per Conservancy	OC	Partial	On-site assessment	MMWCA and tourism partners	Conservancies	Annually	M
	Mara-wide conservancies tourism strategy completed and implemented	OC	No	Strategy approval Work plan approval	MMWCA, AWF and tourism partners	MMWCA	2017	L
	Annual level of bed occupancy	IM	Yes	Compilation of camp statistics	MMWCA, AWF and tourism partners	Conservancies	Annually	M
	Income generated by tourism to conservancy management	IM	Yes		MMWCA, AWF and tourism partners	Conservancies	Annually	M

7. Zoning proposal

In order to achieve the objectives of this plan and enhance the long-term viability of conservation targets, a zoning proposal has been developed encompassing 6 zones. Their definition, objectives and related activities are detailed in the table 5.

It is expected that the proposed definition of zones and geographical location, will be ground-truthed during the first year of the CNR-CAP implementation, in order to be gazetted and to inform the planning processes at the larger scale (namely, the Greater Ecosystem Plan, and the Narok County Spatial Plan).

Table 5: Proposed Definition of Zones for the CNR-CAP

	Zone name	Definition	Activities/objectives	Location
More protection →	Intensive Protection Zone	Critical areas for wildlife conservation	Management of sensitive, endangered, endemic species and critical habitats Research	Established Wildlife Refuges
	Core Conservation Zone	Areas for conservation where some compatible human uses could be allowed (e.g. low-impact tourism facilities)	Wildlife conservation Controlled human use within the context of a management plan	Conservancies Conservation Areas
	Corridors	Areas designed for the free movement of wildlife across the landscape, particularly between two or more fragments of the habitat	Ensuring free movement of wildlife Managed human uses within the context of a management plan	Important migration/ movement routes in non-protected lands
	Community Conservation Zone ("50%-50%")	Important areas for conservation where humans and wildlife can co-exist	Reduce the impact of human activities on wildlife while supporting livelihoods	Human used areas with mixed-use potential (wildlife conservation and livelihoods)
	Multiple-use Zone	Areas where human uses are predominant but pressure on ecosystems and species can be reduced	Making current uses compatible with wildlife and environmental conservation	Intense used areas (e.g. areas neighbouring villages)
← Less protection	Intensive Use Zones	Infrastructure areas, densely inhabited areas	Reduce human-induced impacts Implement innovative urban planning	Villages, roads

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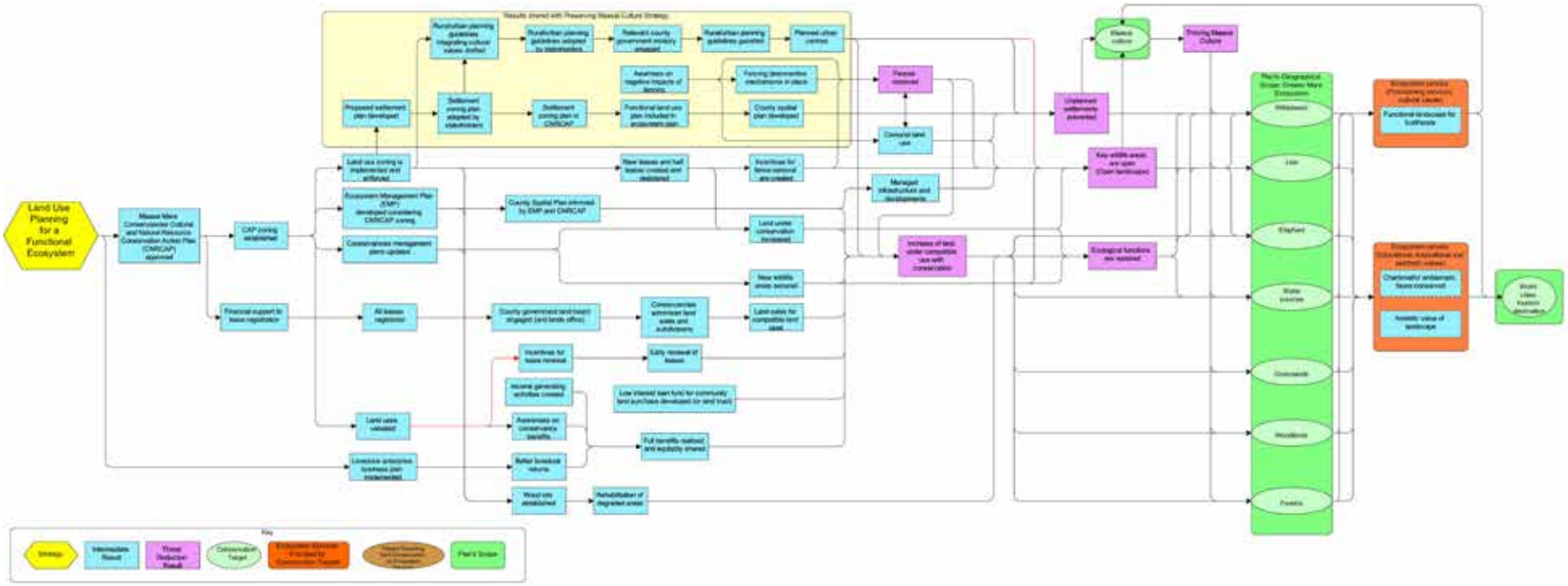
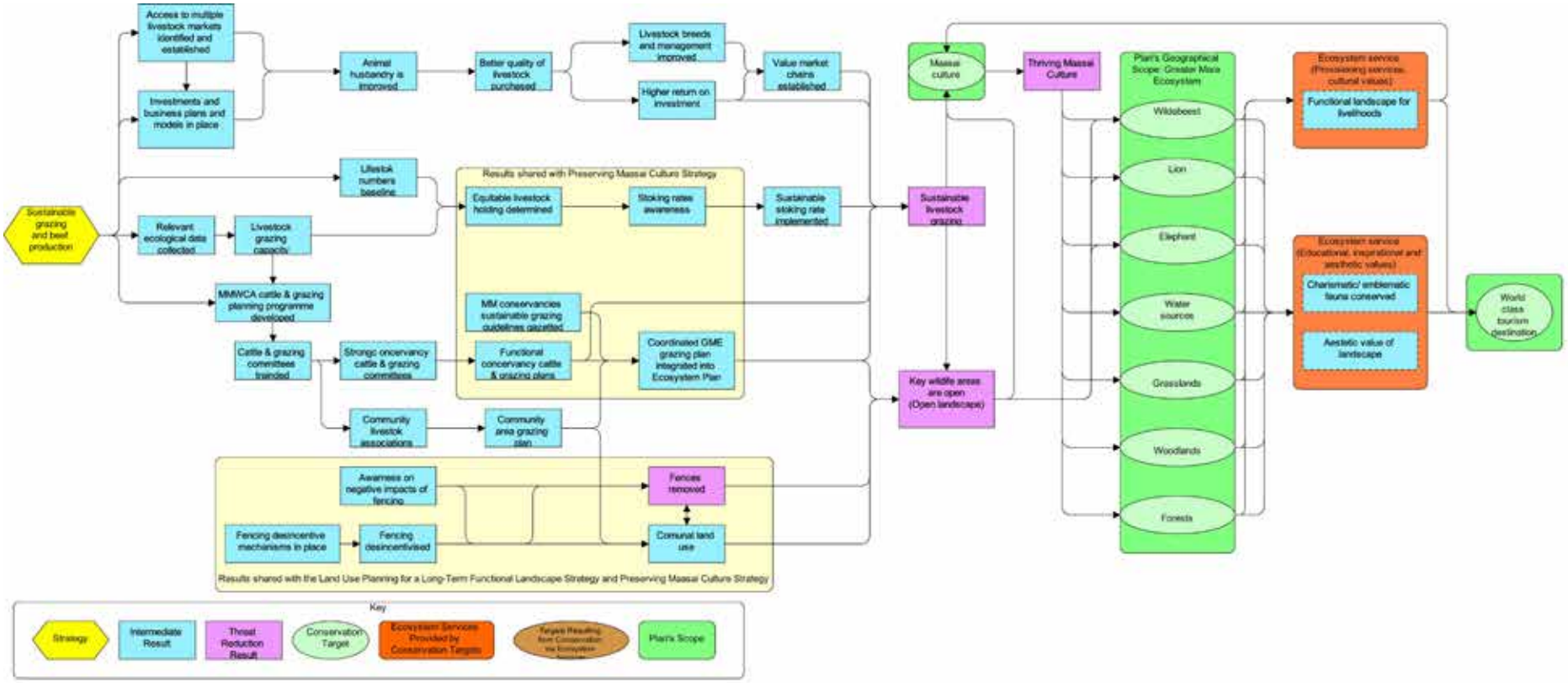
Appendixes

Appendix 1: Result Chain Diagrams

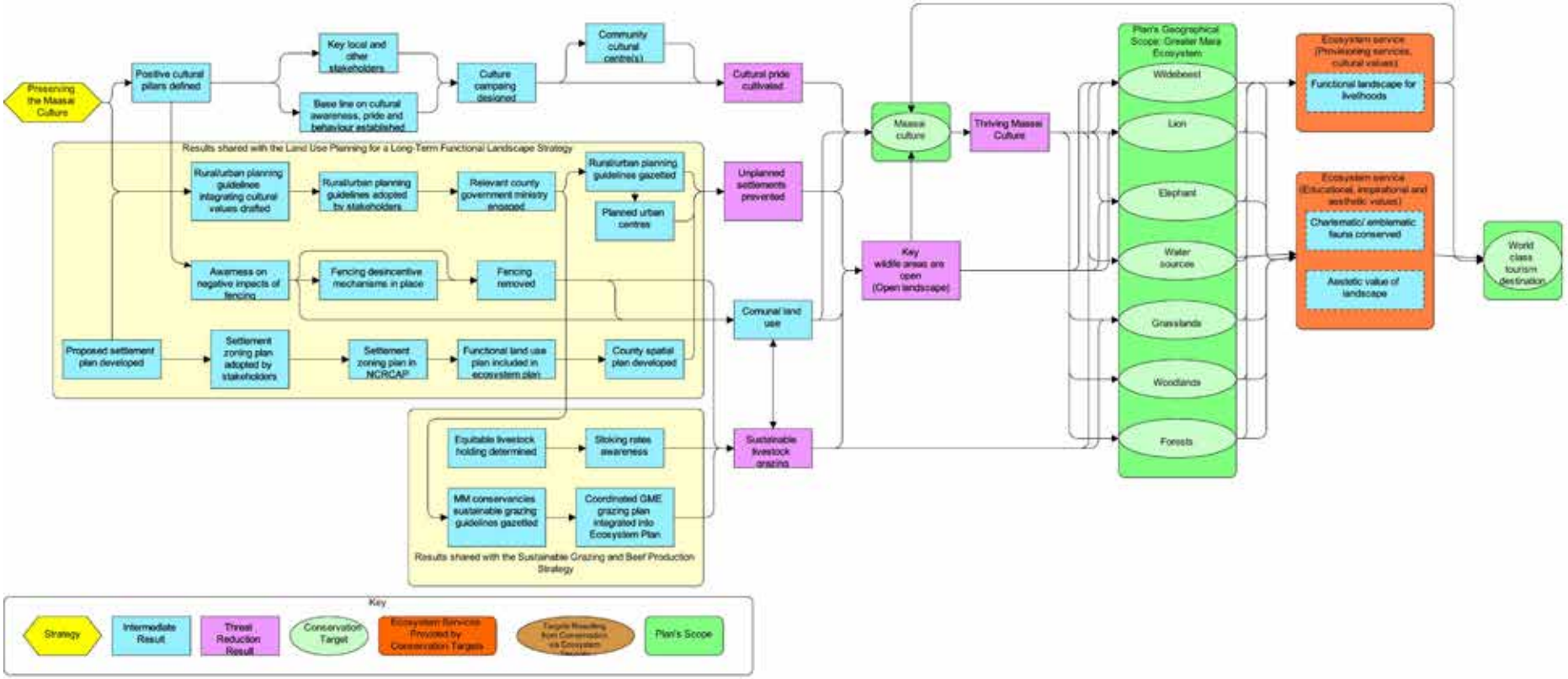
Appendix 1.1: Result Chain Diagram, Strategy Land Use Planning for a Long-Term Functional Ecosystem



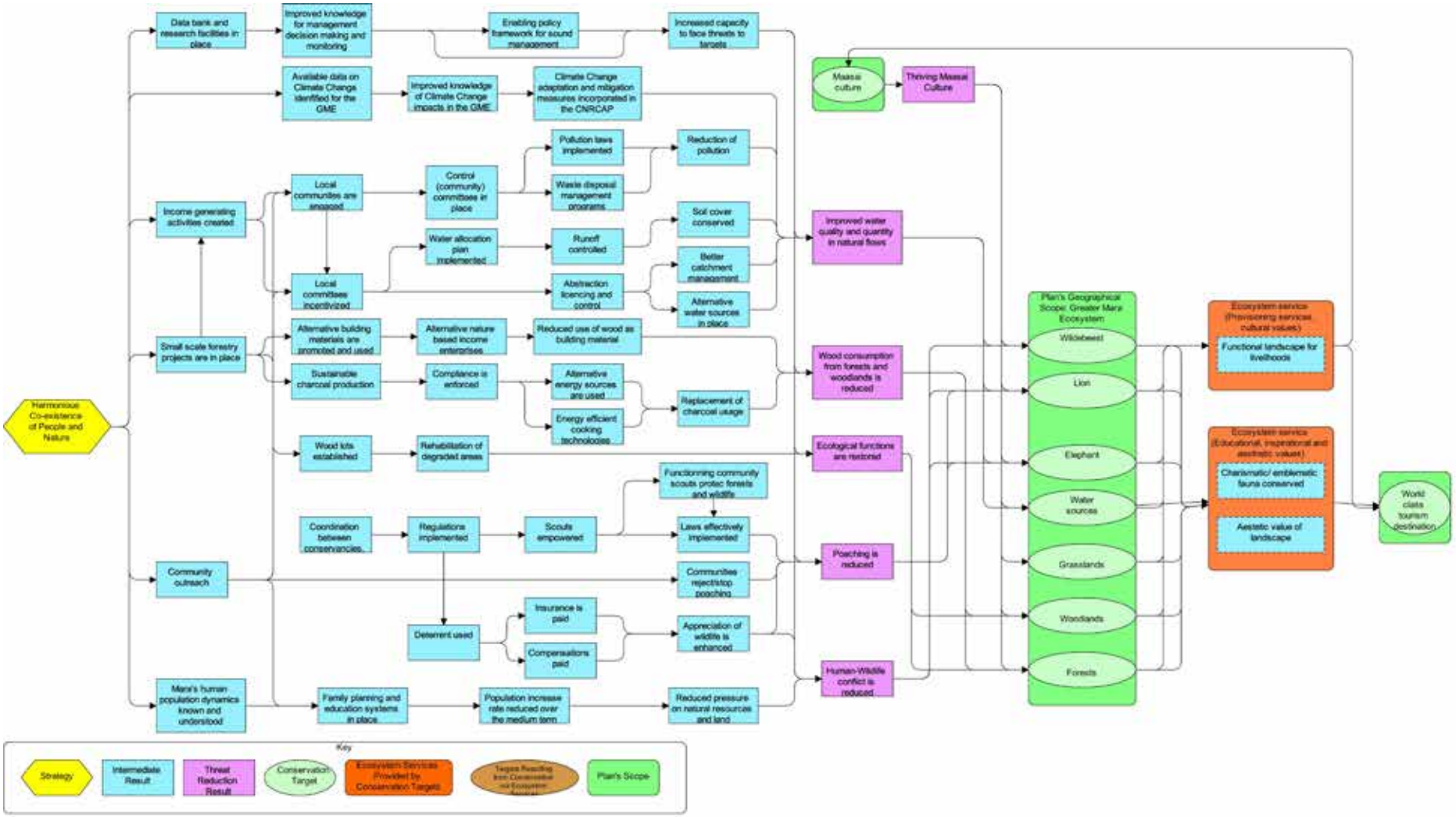
Appendix 1.2: Result Chain Diagrams, Strategy Sustainable Grazing and Beef Production



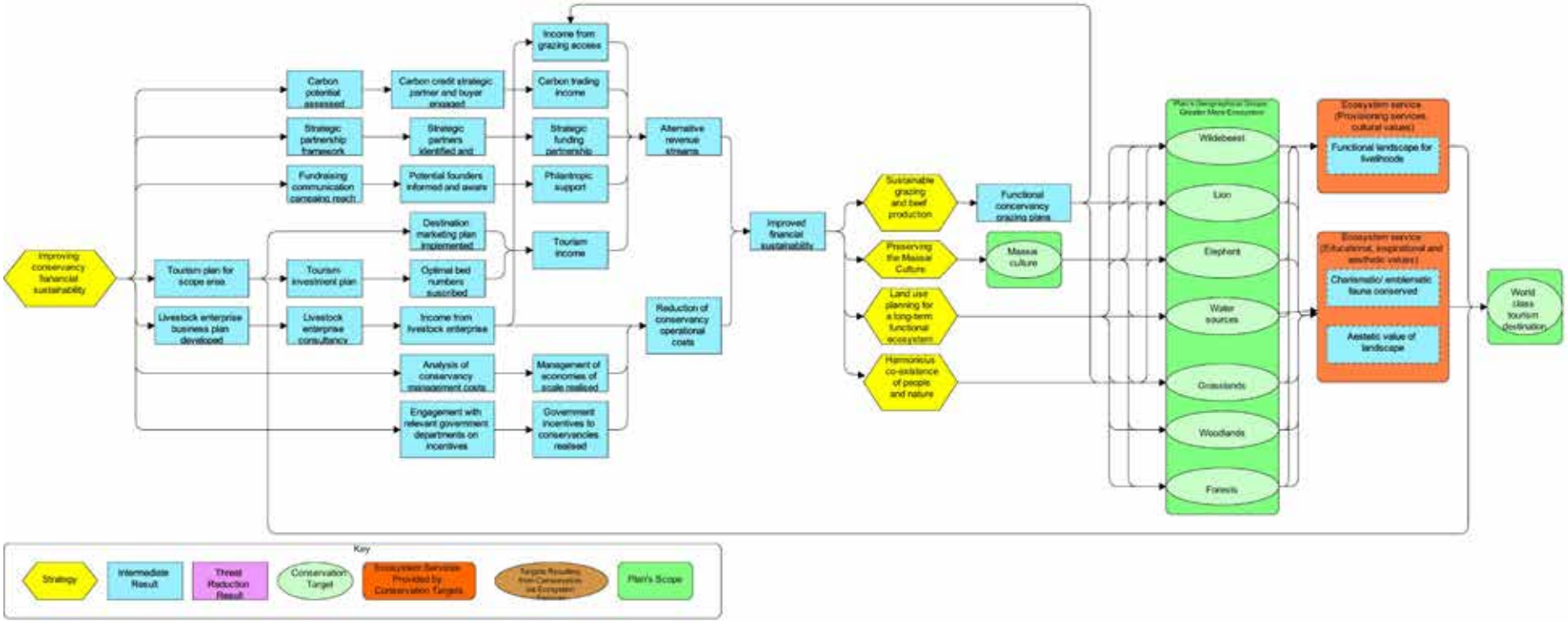
Appendix 1.3: Result Chain Diagrams, Strategy Preserving the Maasai Culture



Appendix 1.4: Result Chain Diagrams, Strategy Harmonious Coexistence of People and Nature



Appendix 1.5: Result Chain Diagrams, Strategy Financial Sustainability



Appendix 2: List of participants in the plan review workshop

	Name of Official	Designation	Institution	Email Address
1	Amoke, Irene	PKWT Projects	KWT	iamoke@kenyawildlifetrust.org
2	Anderson, Sean	Chairman	Naiboisho Conservancy	sean@edutoursafrica.com
3	Bashir, Munira	Country Director	TNC	munira@tnc.org
4	Beaton, Gerard	Manager	Asilia Africa/ Naiboisho	gerard@asiliaafrica.com
5	Earnshaw, Allan	CEO	KWT	allan@earnshawsafaris.com
6	Esau, Kenn	Techincal Assistant	TNC	kennesau@yahoo.com
7	Gibbons, Helen	CEO	MMWCA	hele@maraconservancies.com
8	Heath, Justin	Manager	Seiya Ltd	justin@seiya.com
9	Hernadez- Salazar, Daniel	Photographer	TNC/MMWCA	dfdjhs@gmail.com
10	Hoffmeyer, William	Manager	Olarro Conservancy	wildlife@olarrokenya.com
11	Kaelo, Dickson	CEO	KWCA	dkaeolo@kwcakenya
12	Kipees, Sylvester	Member	OWCT	slyvesterkpiees@yahoo.com
13	Kisemei, Julius	Manager	Lemek Conservancy	juliuskisemei@yahoo.com
14	Leparan Kisser, Musa	Alternate	MMWCA	musaleparan@gmail.com
15	Lukume, Ben	Manager	Paradamat Conservancy	benlenkume@gmail.com
16	Maldonado, Oscar	Consultant	TNC	oimaldonado@gmail.com
17	Matthews, Sean	Manager	Olarro Conservancy	wildlife@olarrokenya.com
18	Mautai, Dominic	Member	Naiboisho Conservancy	mtobiko@yahoo.com
19	Monson, Greg	Managing Director	Kicheche	greg@kicheche.com
20	Mopel, John	Land owner	MMWCA	mopelj@gmail.com
21	Mopel, Johnson	Chairman	Maasai Moran	
22	Muchiri, Francis	Warden	KWS Narok	muchirif@gmail.com
23	Muli, Daniel	Head Community	MMWCA	muli@maraconservancies.org
24	Musyoki, Kioko	General Manager	Mara Sarova	kiokomusyoki@sarovahotels.com
26	Mwangi, Evans	Project Manager	PREPARED	evans.mwangi@ea-prepared.org
27	Ndetei, Robert	Head of Species	WWF	rndetei@wwfkenya
28	Nkoitoi, Francis	Manager Mara North	Mara North Conservancy	nkoitoifr@yahoo.com
29	Nkoitoi, Simon	Manager	Ol Kinyei Conservancy	snkoitoi@yahoo.com
30	Nkuyato, Emmanuel	Naturalist	Mara Sarova	nkuyato99@gmail.com
31	Ntutu, Mustafa	Manager	Ol Choro Conservancy	olarinkensafaria@gmail.com
32	Omondi, Collins	County Warden	KWS	omondic@kws.go.e
33	Pye, Richard	Chair	Olare Motorogi Conservancy	manager@olaremotorogiconservancy.com
34	Ripau, Maias	Itern	OOMT	ripaum@gmail.com

35	Sengeny, John	Chairman	Naiboisho Landholding Company	johnsengeny@yahoo.com
36	Seno, Simon	VC MMU	Maasai Mara University	seno@mmarau.ac.ke
37	Shuuru, Benjamin	Member	Nyakweri Conservancy	benjashu@gmail.com
38	Sipitiek, Johnson	Chair CWCCC	Africa Conservation Center	johnson.sipitiek@acc.or.ke
39	Sopia, Daniel	Chairman	MMWCA	sophia@maraconservancies.org
40	Tambara, Edwin	Conservation Planner	AWF	etambara@awf.rg
41	Thompson, Stewart	Researcher	Oxford Brookes Univeristy	sthompson@brookes.ac.uk